Heating Piping & Air Conditioning

DESIGN
INSTALLATION
OPERATION
MAINTENANCE

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INDUSTRIAL
COMMERCIAL
INSTITUTIONAL AND
PUBLIC BUILDINGS

Page 181—Journal Section of The American Society of Heating and Ventilating Engineers

January 1953

DIRECTORY & SHOW NUMBER

. . . . see the yellow pages for Directory Section

FOR CLASSY SHOPS

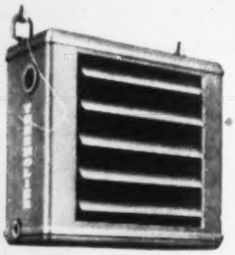
. . . OR BUSY PLANTS

THERMOLIER UNIT HEATERS

The condensed table below is a quick guide to the selection of the correct Thermolier for specific conditions. The capacities, when motors are operating at normal speeds, are based on Standard Basis of Rating: 2 lb. steam pressure and 60° F entering air temperature. Grinnell Thermoliers are tested and they are rated in strict accordance with rules of the Industrial Unit Heaters Association.

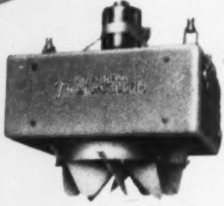
All Thermoliers can be operated at working steam pressures up to 125 psi and steam temp. up to 406° F.

A MODEL AND SIZE FOR EVERY PURPOSE



horizontal delivery

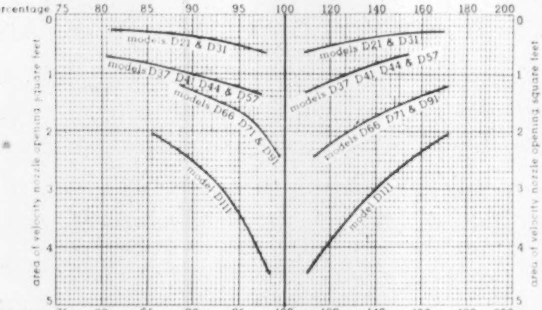
textile (horizontal delivery)

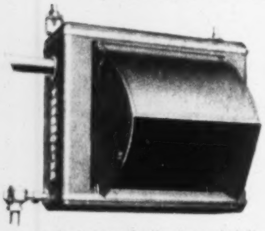


vertical delivery

model	total heat delivered, Btu per hr	sq ft edr (nominal)	air velocity at exit, louvers open, lin. ft. per min.
horizontal delivery			
D21	35,600	148	786
D31	48,700	203	851
D37	62,200	259	753
D41	71,000	295	901
D44	84,100	350	887
D57	101,300	422	1016
D66	128,700	536	779
D71	151,700	632	977
D91	196,000	817	985
D111	275,300	1147	1048
Textile			
TX70	69,800	291	826
TX110	113,700	474	877
vertical delivery			
VA1042	50,800	212	1399
VA1045	73,600	307	1287
VA1065	109,400	456	1354
VA1075	145,600	607	1231
VA1101	185,000	770	1495
VA1111	257,000	1071	1631

performance with velocity nozzle ▶





velocity nozzle (horizontal delivery)

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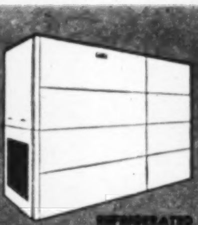
THERMOLIER UNIT HEATERS

CALL YOUR LOCAL GRINNELL DISTRIBUTOR

Grinnell Company, Inc., Providence, Rhode Island • Coast-to-Coast Network of Branch Warehouses and Distributors

Manufacturer of: pipe fittings • welding fittings • forged steel flanges • steel nipples • engineered pipe hangers and supports Thermolier unit heaters • Grinnell-Saunders diaphragm valves • prefabricated piping • Grinnell automatic fire protection systems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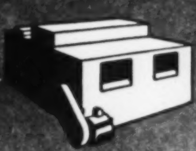
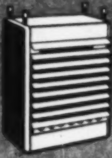
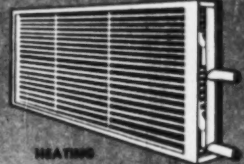

UNIT AIR CONDITIONERS


GAS FIRED UNIT HEATERS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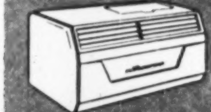
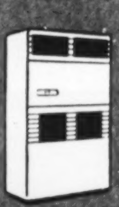

ROOM AIR CONDITIONER

HOME AIR CONDITIONER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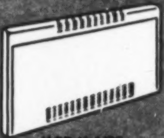

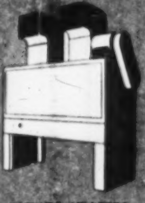
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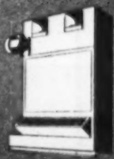
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air conditioning equipment

at the

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Booth 2-228

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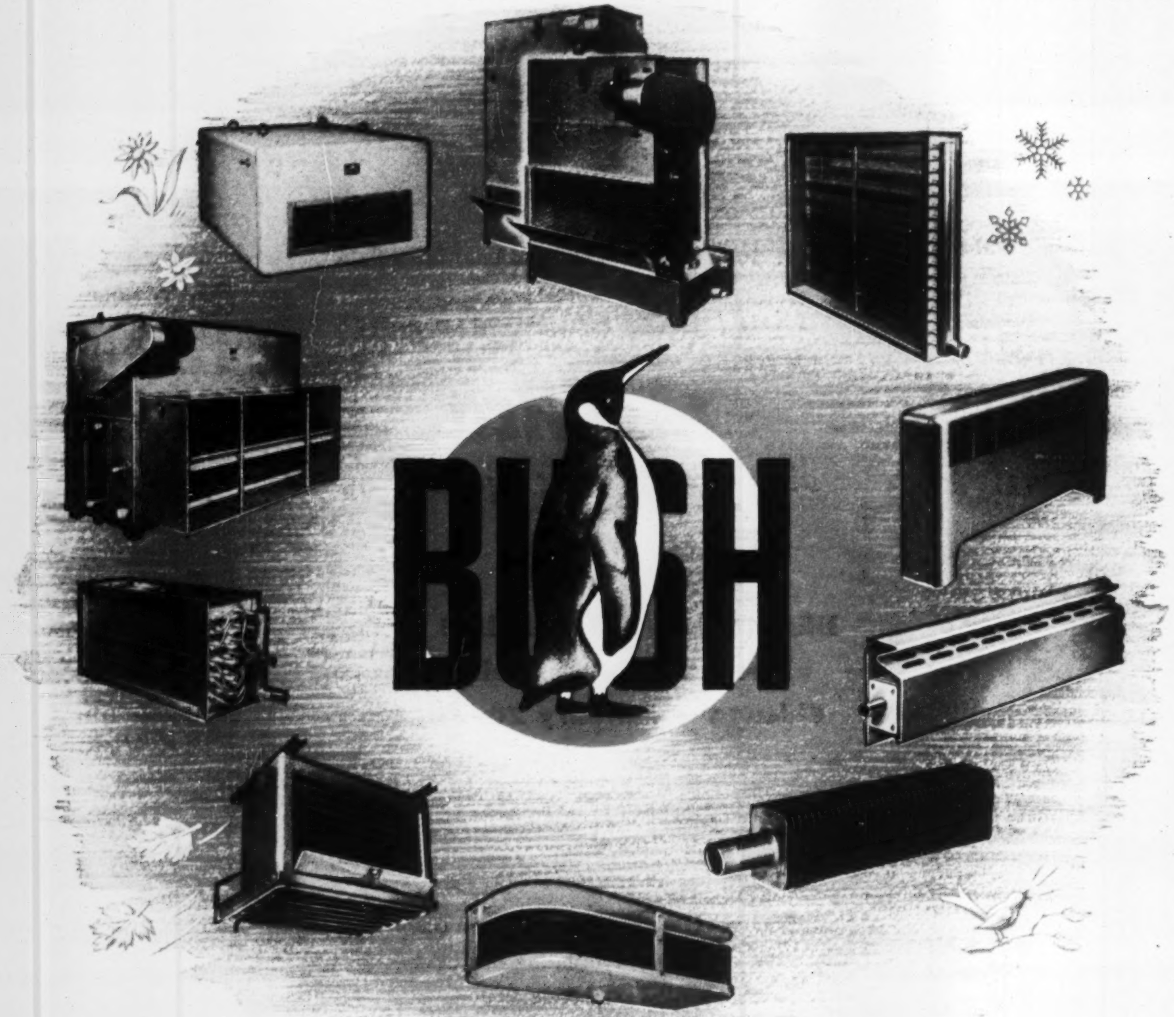
LEADING THE WAY THE YEAR 'ROUND



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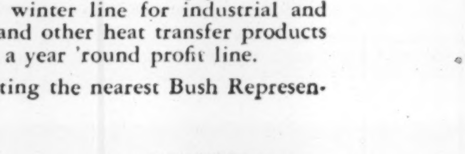

Heating Piping & Air Conditioning

Vol. 25 No. 1

(with which is merged the Aerologist)

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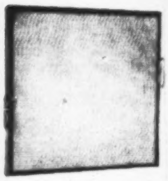

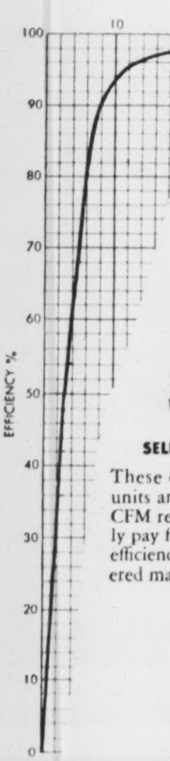

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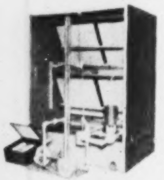

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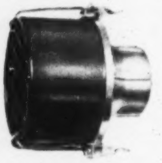

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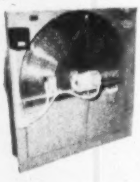
Many types and sizes of engine and compressor filters are available or can be engineered to your requirements.



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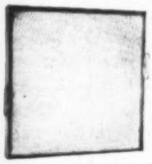

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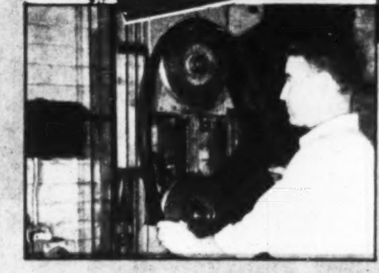

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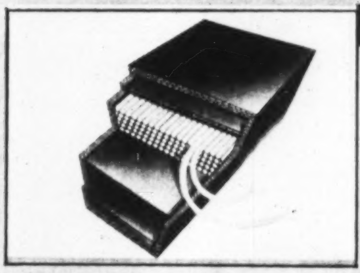
Durkee-Atwood's new vertical V-belt matching machines eliminate the "sag" error always present when V-belts are matched on horizontal matching equipment. Calibration of true running length assures equal power transmission from all belts on multiple belt drives. The machines also test for vibration and possible internal imperfections.



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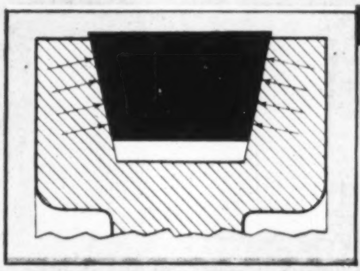

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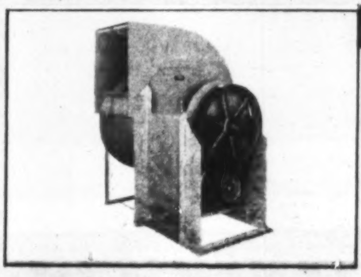

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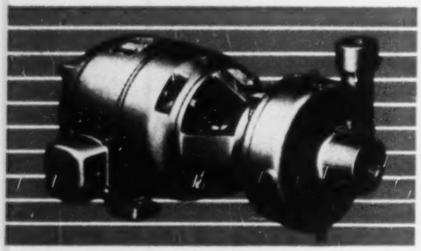

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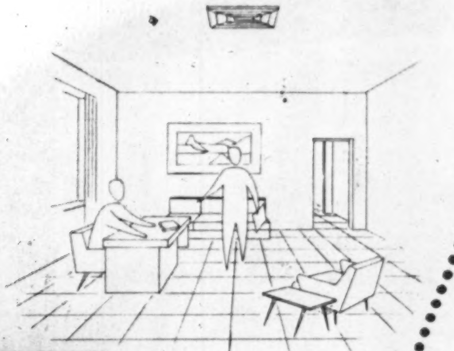
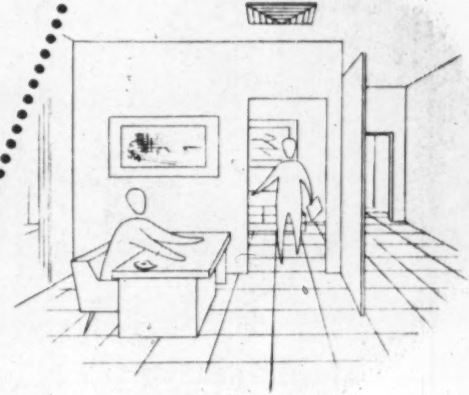
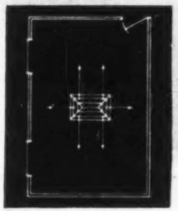
How to be years ahead...over head







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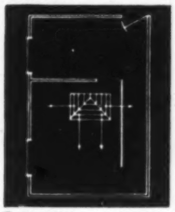

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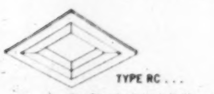
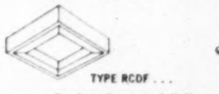


TYPE RC . . .
For Standard Installations



TYPE RCDF . . .
For Drop Frame Installations

TYPE RCTC . . .
For Tile Ceilings

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[illegible] 11, Ill.—646 N. Lakeshore Dr.
[illegible] Ohio—[illegible] Euclid Ave.
[illegible]—[illegible] Wyoming Av
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ONE OF THE MOST COMPLETE LINES IN THE INDUSTRY

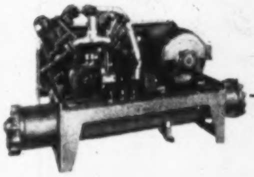
NEW improved

Curtis CONDENSING UNITS

at NEW, LOW PRICES

All with these Famous Curtis Features:

- **TIMKEN TAPERED ROLLER BEARINGS**
- **POSITIVE LUBRICATION**
- **OIL LEVEL SIGHT GLASS**
- **SLOW SPEED OPERATION FOR LONG LIFE AND HIGH EFFICIENCY**

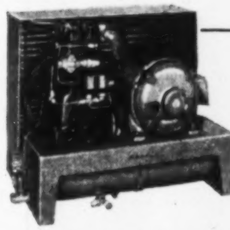


WATER COOLED CONDENSING UNIT

Low, Regular and High Temp., from ⅓ H.P. to 50 H.P.

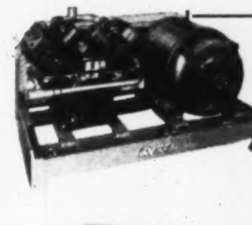
AIR COOLED CONDENSING UNIT

Self-contained, remote, truck type, from ¼ H.P. to 3 H.P.



COMBINATION AIR AND WATER COOLED CONDENSING UNIT

Plenty of reserve capacity for extreme hot weather. Operates primarily as air cooled unit with shell and coil condenser as auxiliary in case of overload. From ⅓ H.P. to 3 H.P.



COMPRESSOR UNITS

For use with evaporative condensers, low temperature cooling, processing and air conditioning installations, from 3 H.P. to 50 H.P.

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INTERNATIONAL AMPHITHEATRE
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BOOTHS: 234, 236, 238, 335, 337, 339

SEE OUR EXHIBIT

Plus a complete line of packaged units in six sizes $2\text{-}3\text{-}5\text{-}7\frac{1}{2}\text{-}10\text{-}15$-H.P.

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of Curtis Manufacturing Company
1950 KIENLEN AVENUE, ST. LOUIS 20, MISSOURI

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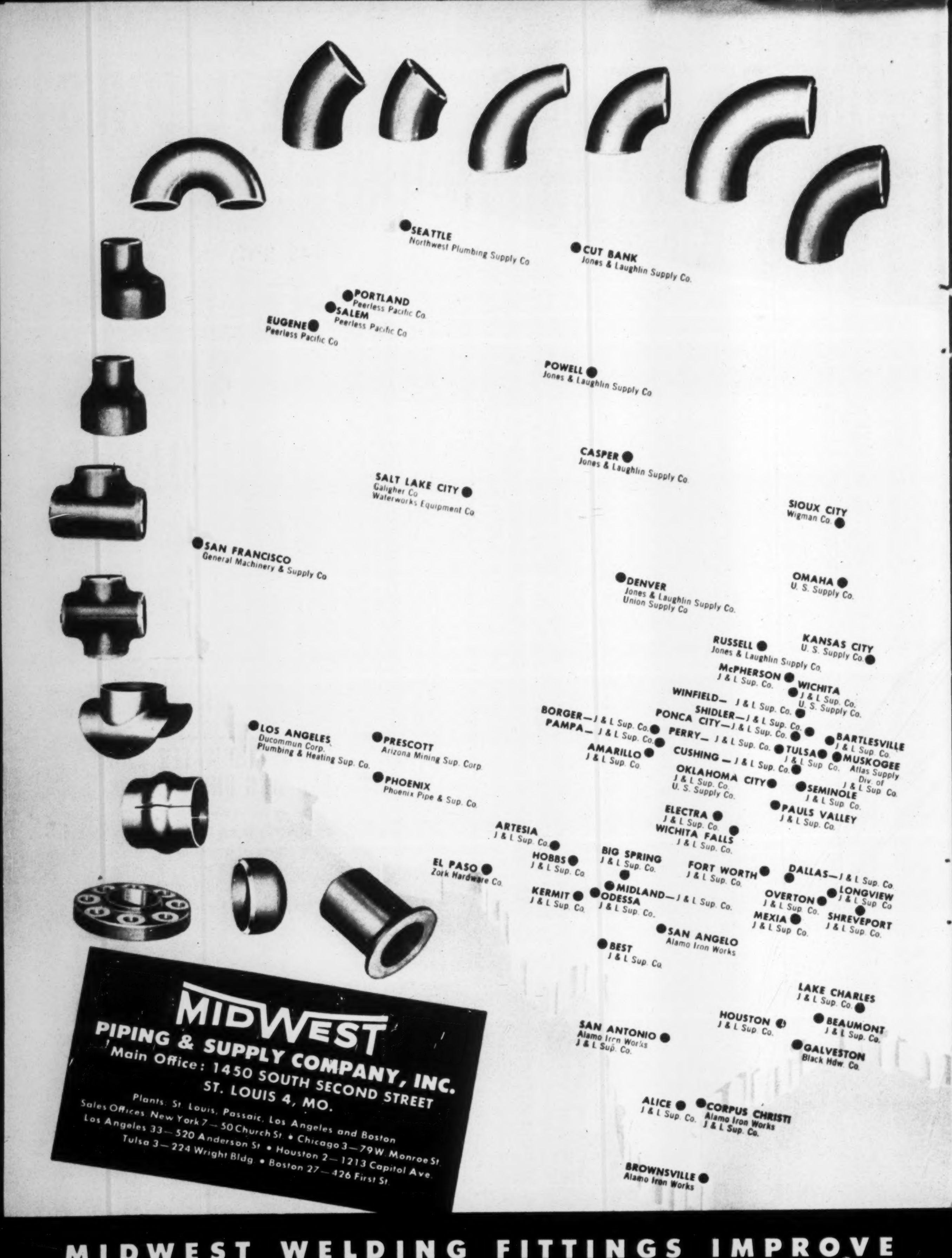

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Let's not overlook

Quality is a relative term — it can be poor, medium, high or the best. We think you should evaluate fans and air cleaning and conditioning equipment according to the "Q" Factor.*

Engineers are not easily misled when they turn an engineering eye on mechanical things. They know that efficiency is important, and that rugged construction, ease of assembly and repair are also desirable. They value simplicity if it's not for economy of manufacture. Above all, we believe, they admire reliable, long life performance.

Because in seventy-five years of manufacturing fans, air cleaning and conditioning equipment, we have stuck to an original idea — "build it the best we know how", we welcome your critical inspection of "Buffalo" products. You'll find that both design and construction contribute to their record for long life on the job.

Engineering sales representatives in principal cities are anxious to work with you.

**The "Q" Factor — The built-in Quality which provides trouble-free satisfaction and long life.*

"Buffalo"

BUFFALO FORGE COMPANY

171 MORTIMER STREET BUFFALO, NEW YORK

PUBLISHERS OF "FAN ENGINEERING" HANDBOOK

Canadian Blower & Forge Co., Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

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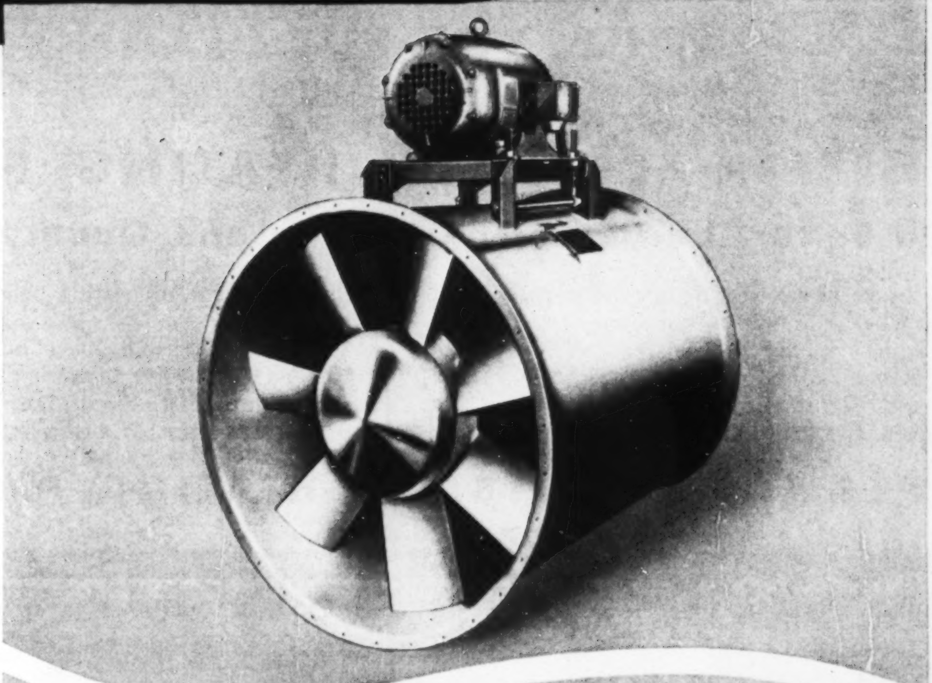
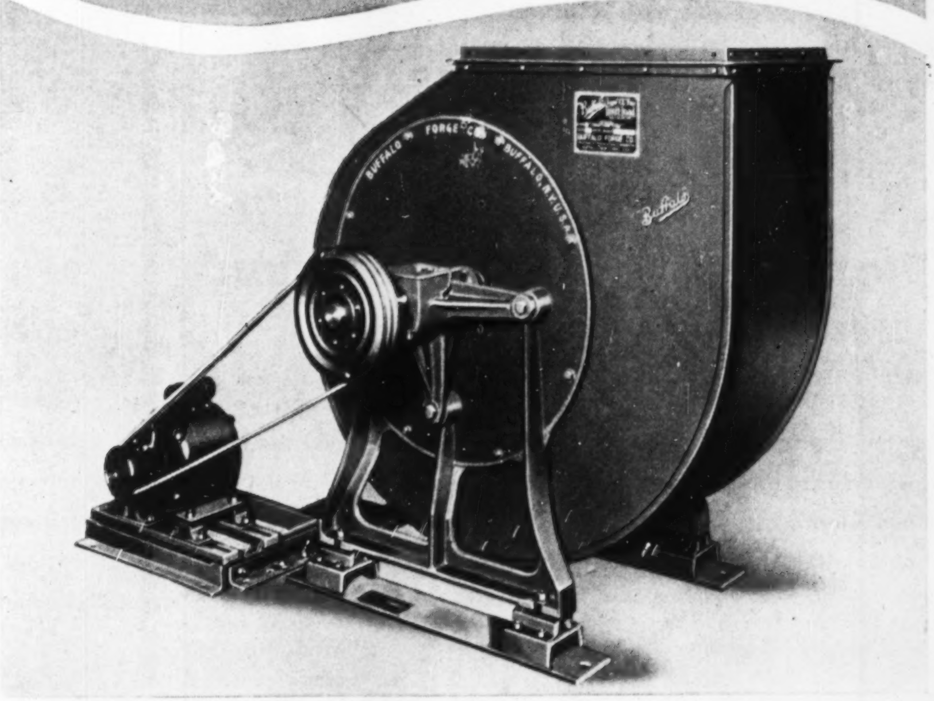
The quiet, efficient Type "B" Vaneaxial Fan is one reason why "Buffalo" has earned—and kept—the reputation "First for Fans."




BUFFALO FORGE CO. BUFFALO, N.Y. U.S.A.
Buffalo

"Buffalo" Limit-Load, the fan that supplies the air for many of the world's finest ventilating and air conditioning systems.

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WHEN YOU BUY HEATING PUMPS

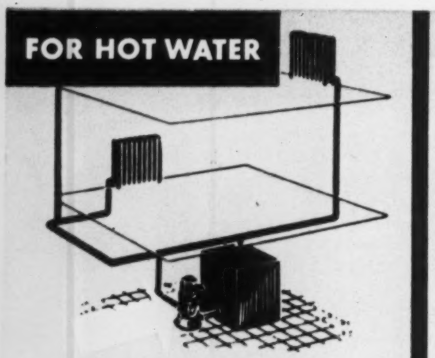
WHEELER-ECONOMY HEATING PUMPS
with Better-Than-Ever Engineering and Quality Control

With the consolidation of Economy Pumps, Inc. and C. H. Wheeler Manufacturing Company, the heating pumps you have always bought as "the best in the field" will now be sold as WHEELER-ECONOMY HEATING PUMPS. Representatives are being appointed in key areas to give you good service with a time-honored line of heating pumps that is now *better than ever*.

The Wheeler-Economy line of heating pumps has undergone a complete engineering check-up and re-analysis from the castings out. Many refinements have been made and a new face-lifting has been effected . . .

TYPES FOR EVERY BASIC HEATING PROBLEM

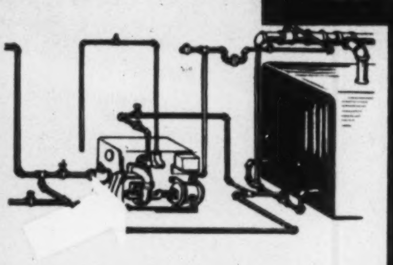
FOR HOT WATER



HOT WATER CIRCULATION

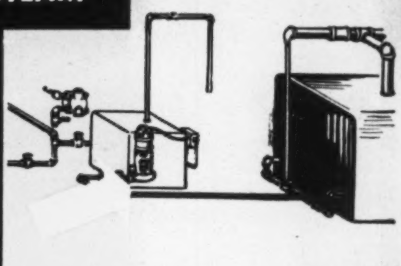
Wheeler-Economy Circulating Pumps deliver hot water to radiators quickly and return warm water to boiler with high efficiency.

FOR STEAM



STEAM VACUUM

The Wheeler-Economy Vacuum Pumps employ the most efficient design ever devised for removing air and water from condensate return lines.



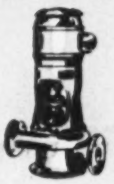
RETURN CONDENSATION

Wheeler-Economy Condensation Pumps give outstanding performance in a compact dependable design.

WHEELER-ECONOMY HOT WATER CIRCULATING PUMPS

Type SCV—Vertical direct connected centrifugal pump. Sizes 1" to 3". Capacities to 500 GPM. Various RPM speeds 1150 to 3450. Heads to 225'.

Type SCC—Close coupled vertical or horizontal mounted. Sizes 1½" and 2". Capacities to 100 GPM. 3450 RPM. Heads to 120'.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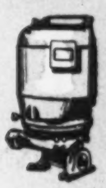

TYPE SCC

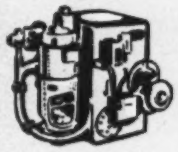
WHEELER-ECONOMY VACUUM PUMPS

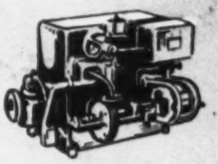
Type VV—Vertical Vacuum Pumps—Suitable for use on all ordinary jobs operating between 3 and 12 inches of vacuum. Made for all discharge pressures up to 150 lb. per sq.in. Capacity sq.ft. E.D.R. 2500 to 15,000. Single and duplex units.

Special Capacities—VVS and VVSD single and duplex units recommended wherever capacity of system or air leakage is greater than ordinary. Also where lifts or pockets in the returns necessitate carrying higher vacuum. (Example: 10 to 16 inches.)

Type SVA—Horizontal Vacuum Pumps—For ordinary jobs operating between 3 and 12 inches of vacuum. Discharge pressures up to 150 lb. per sq.in. Capacity sq.ft. E.D.R. 20,000 to 100,000. Single and duplex units.

Special Capacities—Styles SVS single unit and DVS Duplex Unit, recommended where air capacity or air leakage in the system is greater than ordinary. Also where lifts or pockets in return require the carrying of higher vacuum—example 10 to 16 inches.


TYPE VV


TYPE SVA

WHEELER-ECONOMY RETURN CONDENSATION PUMPS

Type E—Operate at 1750 RPM or for 50 cycle current at 1440 RPM. The best pump where extremely quiet operation is desired. Single and duplex units. Capacity sq.ft. direct C.I. radiation or equivalent: 1000 to 65,000.

Type EC—Available for the same or higher pressure than handled by Type E pumps. Operate at 3450 RPM. Units for 50 cycle current operate at 2880 RPM. Capacity sq.ft. direct C.I. radiation or equivalent 1000 to 65,000. Single and duplex units.

Vertical Underground Pump—Used where returns are below floor level or otherwise too low for horizontal pumps. Cast Iron tank can be installed flush with floor. No pit required for pump. Low and medium pressure units equipped with single stage pumps of vertical design. For higher pressure units a multistage pump of special design is used. Capacity in sq.ft. direct C.I. radiation or equivalent 2000 to 50,000. Single and duplex units.

Type S—Condensation Pump with Steel Receiver—An "Economy" installation where service is not severe and heavy construction cast iron tanks are not required. Where steel receiver is satisfactory and low cost is of primary importance Type S is recommended. However, these low cost models are the equal of the top grade in many competitive lines. Single or duplex units.

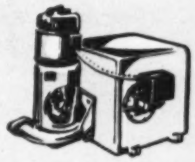
Type MR—Lightweight Pump for low pressure steam heating systems. Priced to meet competition . . . with no compromise in workmanship and materials. Capacities up to 65,000 sq.ft. E.D.R. Single and Duplex Units.

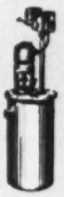
Types B and C—Horizontal Return Condensation Pumps—Type B multi-stage pump for pressures up to 150 lbs. 1750 RPM. Quiet operation. Capacities in sq.ft. direct C.I. radiation equivalent to 6000 to 65,000.

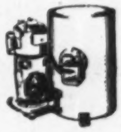
Type C multi-stage pump for pressures up to 175 lbs. 3600 RPM 60 cycle. Identical to type B except for higher speed operation. Capacities in sq.ft. direct C.I. radiation equivalent to 6000 to 65,000.

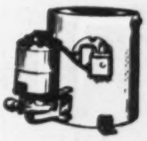
Type G—Horizontal Return Condensation Pump—Type G single suction, single stage designed for medium and high pressures at motor speeds 1800 to 3450 RPM. Receivers of all three types, "B", "C" and "G" are welded steel plate unless otherwise ordered.

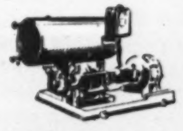
All Wheeler-Economy Heating Pumps are tested before shipment and guaranteed for workmanship and materials.

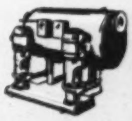

TYPES E & EC


TYPE U


TYPE S


TYPE MR


TYPES B & C

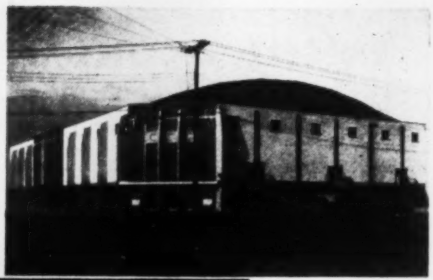

TYPE G

SOME TERRITORIES STILL AVAILABLE FOR REPRESENTATIVES WHO QUALIFY
Over 15 million dollars' worth of these pumps are in use throughout the United States

126

WHEELER-ECONOMY PUMPS

ECONOMY PUMPS, INC. · DIVISION OF C. H. WHEELER MANUFACTURING CO.
19TH AND LEHIGH PHILADELPHIA 32 PA



SPANG CW

keeps West Virginia's skaters on their toes

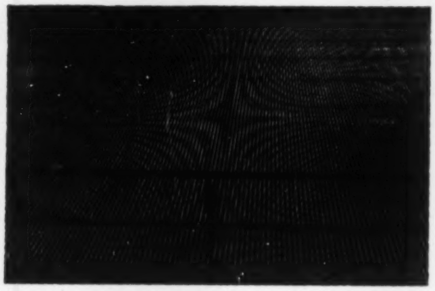
Figure skaters never worry about the weather in Huntington, West Virginia. In their new million dollar recreational center the ice stays hard and fast all during the season. And it's kept that way day after day by a refrigerant flowing through a welded web of Spang CW Steel Pipe under the entire skating area.

Wherever long time reliability is a must whether in skating rinks or the largest commercial buildings – architects, contractors, owners consistently specify dependable Spang CW. They know from experience that the name Spang is a guarantee of year after year of maintenance-free service.

Quality-controlled from steel to finished form, Spang CW is always uniform in every dimension. Easy to cut, easy to weld, easy to bend, it's the *easy* way to reduce installation time and costs.

Specify Spang CW Steel Pipe by name you'll find leading distributors in every section of the country.

Owners: Cabell County Recreation Board *Architect:* Lewis E. Stettler
Contractors: Frick Company, Waynesboro, Pa.



SPANG

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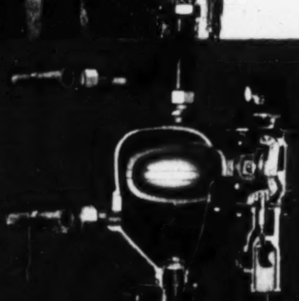
DIVISION OF THE NATIONAL SUPPLY COMPANY

General Sales Office: Grant Building, Pittsburgh 30, Pa. District Sales Offices: Atlanta, Boston, Detroit, Houston, Los Angeles, New York, Philadelphia, Pittsburgh, St. Louis



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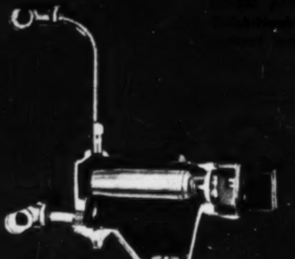

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Man of the Year—

An old timer in our sales organization wrote us:

"For years on end Sam has been recoiling from that empty water glass and listening to the sage advice dealt out to him. As a symbol of the need for steam boiler protection, Sam has done yeoman service; but since the days we first caught up with Sam, the Sam-you-better-scram idea has found its way into fertile fields beyond steam boilers.

"Sam could just as well be scramming today from a hot water boiler that needs a McDonnell Water Feeder or Low Water Cut-off; or a hot water boiler that lacks a McDonnell Btu-rated relief valve; or a water heater that's just about to take off because it lacks a McDonnell pressure relief valve or P & T Valve!"

▬ ▬ ▬ ▬

Well . . . we agree with every word of this except taking Sam away from his familiar spot in front of that old steam boiler; Sam wouldn't like it. Today, however, Sam does exemplify the dangers that lurk in steam boilers, hot water heating boilers, hot water tanks and water heaters . . . all within the expanded perimeter of McDonnell safety devices.

All of these products have been developed to meet the established need for greater safety. As the inadequacy of former safety measures have been exposed by engineering studies and written into codes, McDonnell products have kept pace with requirements . . . have often been a step ahead.

So today you owe it to yourself and your customer to familiarize yourself with the better ways of protecting boilers and heaters of every type as covered in the new McDonnell catalog. In the growing 1953 field of boiler and heater safety, Sam is your man of the year!

McDONNELL & MILLER, *Inc.*

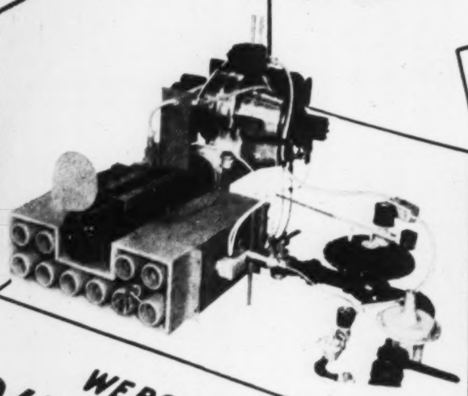
3500 N. Spaulding Ave., Chicago 18, Ill.

Doing One MM *Thing Well*

Your Jobber

McDONNELL

. . . another *first* in '53



WEBSTER
DUONETIC*
Dual Fuel Firing
BURNER

Opened January 1952 at Webster Engineering Co.'s 6th Annual Sales and Engineering Conference

- Individual Units designed for each fuel for Boilers rated from 10 to 50 Horsepower
- Low Pressure Natural Gas and Light Fuel Oil
- Optional Automatic Fuel Change-over
- Oil Burner Protected During Gas Cycle
- Positive Interlock
- Low Base Height
- No Electrical Power for Gas
- Electronic Safeguards

WEBSTER
ROTONETIC*
Dual Fuel Firing
BURNER

To be Opened at
WEBSTER-ENGINEERING COMPANY
7th Annual Sales and Engineering Conference
JAN. 21-22 . . . TULSA

- COMPLETE package of well-known **WEBSTER DYNETIC** Gas Burner and Horizontal Rotary Oil Burner for Boilers rated from 50 HORSEPOWER and above.
- Low Pressure Natural Gas
- All Grades of Fuel Oil
- Electronic Safeguards
- Minimum Base Height
- High, Low, or Modulating Control

* TRADE MARK

The WEBSTER ENGINEERING COMPANY
TULSA, OKLAHOMA
Division of SURFACE COMBUSTION CORPORATION, Toledo, Ohio

for more than 40 years a leader..

and now

WALDRON *Junior* GEAR COUPLING

Patent applied for

Weighs only 2¼ ounces.

•

Strong, durable, non-magnetic, non-corrosive.

•

Requires no lubrication.

•

Available in ⅜" — ½", ⅝" — ¾" hub bores.

Now for the first time an inexpensive gear type coupling for the smallest fractional H.P. drives. The same major construction features of the modern gear type couplings so widely used for larger units is now available for nominal bores down to ⅜" diameter.

This amazing new WALDRON Junior Gear Type Coupling has two externally geared hubs enclosed in an internally geared sleeve that takes any size hub from ⅜" to ¾" bore. Made of smooth, tough, unbreakable nylon, it withstands corrosion and is not affected by most liquids and gases.

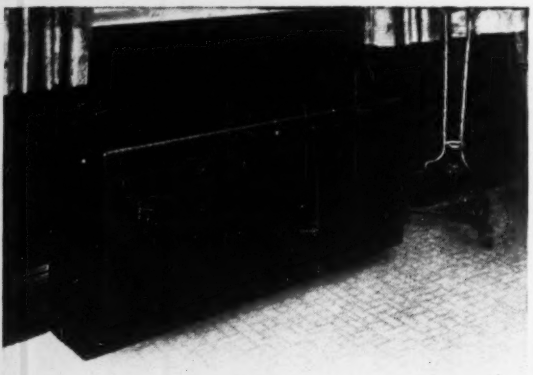
These small, compact, light weight WALDRON Junior Couplings now provide an economical solution to drive problems on hundreds of different types of apparatus.

Write us today for full particulars, sizes, dimensions, ratings, etc.

JOHN WALDRON CORPORATION

NEW BRUNSWICK • NEW JERSEY

Sales Representatives In Principal Cities • In Canada—Peacock Brothers, Ltd.



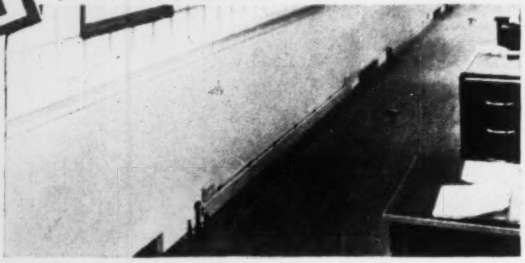
Summer cooling... Winter heating

MODERNIZATION
made easy with
THE REMOTAIRE

an individual room, remote type unit providing year 'round air conditioning

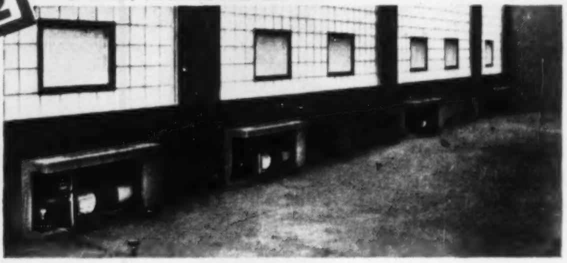
1

Actual installation scene in large industrial office building showing arrangement of piping and ventilation aperture before placement of Remotaire units.



2

View of Remotaires with front covers removed. Large open area such as this can be partitioned into small offices, each with an individually controlled Remotaire unit.



3

View of building showing ventilator apertures as they look from the street. Ventilation air can be supplied by several other methods, if desired.

THE Remotaire by American-Standard provides efficient, economical all-weather air conditioning for hotels, motels, apartments, schools, office and industrial buildings, and other types of multi-room installations.

The Remotaire is ideal for new construction as well as modernization. It uses chilled water from a central water chiller for cooling and warm water from a central heating plant for heating. Ventilation comes from a small wall aperture behind each unit, thus eliminating use of large, expensive, space-consuming ductwork. For descriptive literature, write for Form No. 298. **American Radiator & Standard Sanitary Corporation** Dept., HP-102, Pittsburgh 30, Pa.

Designed for simplified economical installation . . .

1. Four standard control packages are available.

2. Coil designed for right or left hand connections. Easily reversed if necessary.

3. Exceptionally quiet fans and acoustically-treated air passages.

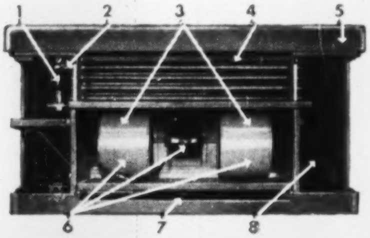
4. Coil shield over the top of coil prevents foreign matter from falling into coil.

5. Cabinet of reinforced furniture steel—plus a reinforced air grille—adds to permanence and long-lasting beauty of unit.

6. Fans and motor on single mounting plate permit easy removal if necessary.

7. Ventilation can be adjusted with the fresh air damper located in each unit.

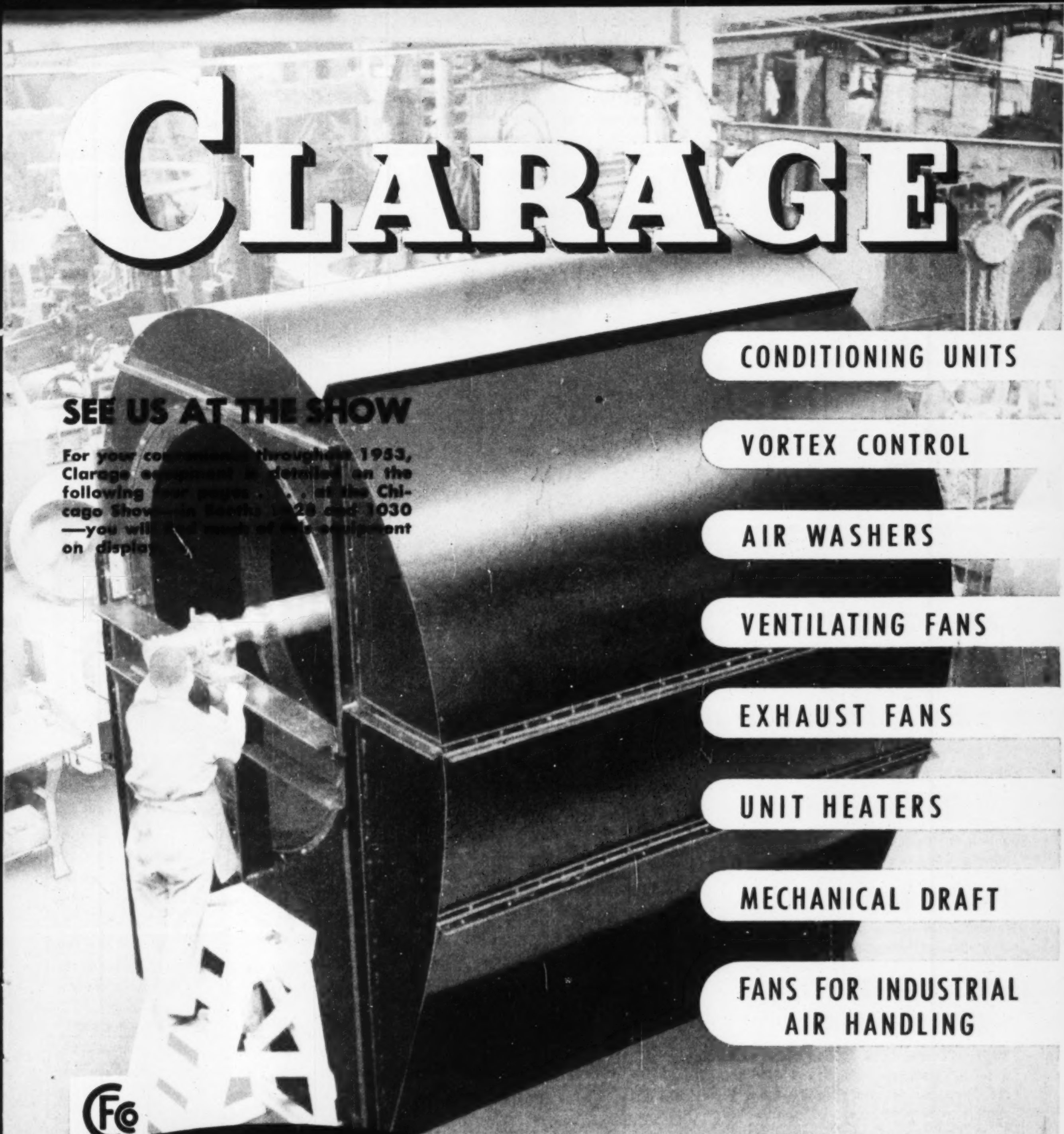
8. Spacious end compartments provide easy installation and allow more than 90° horizontal wrench swing.



AMERICAN-Standard
HEATING-COOLING

Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS EXCHANGERS



CLARAGE

- CONDITIONING UNITS
- VORTEX CONTROL
- AIR WASHERS
- VENTILATING FANS
- EXHAUST FANS
- UNIT HEATERS
- MECHANICAL DRAFT
- FANS FOR INDUSTRIAL AIR HANDLING

SEE US AT THE SHOW

For your convenience throughout 1953, Clarage equipment is detailed on the following four pages . . . at the Chicago Show—in Booths 1028 and 1030—you will find much of this equipment on display.

CFCo

You can rely on . . .

CLARAGE

CLARAGE FAN COMPANY
KALAMAZOO, MICHIGAN

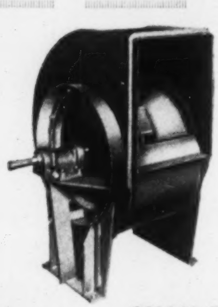
Headquarters for Air Handling and Conditioning Equipment

SALES ENGINEERING OFFICES IN ALL PRINCIPAL CITIES • IN CANADA: Canada Fans, Ltd., 4285 Richelieu St., Montreal

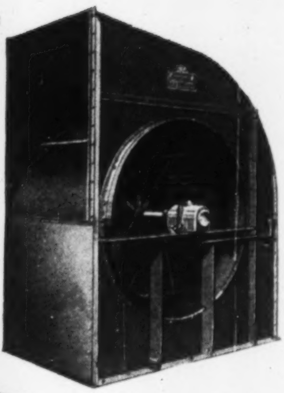
Clarage HEAVY-DUTY *Equipment*

Vortex Control
in fan inlet

**LARGE TYPE
NH FAN**
and large NH fan wheel. All Type NH Fans have motor-protecting, non-overloading performance characteristics.



**SMALL TYPE
NH FAN**
and small NH fan wheel. These smaller fans are adjustable for 8 different directions of air discharge.



TYPE HV FAN
and HV fan wheel which is designed for extreme quietness of operation.

AIR HANDLING AND CONDITIONING FANS

APPLICATIONS: These Clarage Fans are built in two types as shown. They are used for air conditioning and ventilation in all types of buildings. They are also suitable for industrial applications where clean air is to be handled at low pressures. Sizes are available with capacities from 200 to 200,000 c.f.m.

TYPE NH are moderately high speed fans designed for quiet, efficient performance when V-belt or direct driven by standard high speed motors. They are built in 23 sizes starting with size 30. Type NH Fans have an all steel construction as illustrated. They can be furnished with anti-friction or sleeve type bearings.

In sizes up to and including size 73, the Type NH Fans have the Clarage side plate construction which permits easy removal of fan wheel and rotation of fan housing for any of eight different directions of air discharges.

TYPE HV are slow speed fans **exceedingly quiet in operation.** 28 sizes are available. Type HV Fans, up to and including size 3, are of similar construction to the smaller Type NH Fans, and are adjustable as to air discharge and removal of fan wheel. Type HV Fans in the larger sizes are constructed as illustrated. Dust-proof, oil-tight, sleeve bearings are standard equipment.

VORTEX CONTROL as shown above can be furnished on practically all types of Clarage Fans. It is used where requirements demand that the air volume be periodically or continuously changed. Vortex Control has the low first cost of damper control, and the efficient performance of variable speed control. It saves considerably in power cost.

ABBREVIATED PERFORMANCE—TYPE HV FANS, SINGLE WIDTH, SINGLE INLET

Fan Size No.		1	1¼	1½	1¾	2	2¼	2½	2¾	3	3¼	3½	4	4½
Wheel Dia.		13"	16¼"	19½"	22¾"	26"	29¼"	32½"	35¾"	39"	42½"	45½"	52"	58½"
¼" S.P. 1200 O.V.	CFM	1035	1613	2322	3156	4128	5220	6444	7782	9288	10890	12660	16524	20880
	RPM	509	407	327	281	245	217	197	178	164	146	316	120	106
	HP	.12	.18	.22	.29	.38	.48	.59	.75	.85	1.04	1.22	1.59	2.00
½" S.P. 1300 O.V.	CFM	1122	1748	2516	3419	4472	5655	6981	8430	10062	11798	13715	17910	22620
	RPM	637	510	412	353	308	273	247	224	206	188	174	152	135
	HP	.19	.29	.36	.49	.64	.81	1.00	1.20	1.44	1.64	1.90	2.48	3.13
¾" S.P. 1400 O.V.	CFM	1208	1882	2709	3682	4816	6090	7518	9078	10836	12705	14770	19278	24360
	RPM	748	598	490	420	367	325	294	264	245	222	206	180	160
	HP	.28	.44	.54	.73	.95	1.20	1.48	1.76	2.13	2.45	2.85	3.72	4.70
1" S.P. 1500 O.V.	CFM	1294	2016	2903	3945	5160	6525	8055	9727	11610	13613	15825	20655	26100
	RPM	851	680	557	478	417	369	335	302	279	252	233	204	181
	HP	.39	.61	.72	.98	1.28	1.61	1.99	2.38	2.87	3.28	3.80	4.97	6.26
1¼" S.P. 1600 O.V.	CFM	1380	2150	3096	4208	5504	6960	8592	10375	12384	14520	16880	22032	27840
	RPM	944	754	618	530	463	410	371	336	309	280	261	228	203
	HP	.52	.80	.93	1.26	1.66	2.09	2.58	3.13	3.72	4.33	5.02	6.55	8.27
1½" S.P. 1800 O.V.	CFM	1552	2420	3482	4734	6192	7830	9666	11672	13932	16335	18990	24786	31320
	RPM	1039	830	683	585	512	453	410	369	341	308	286	250	222
	HP	.70	1.09	1.30	1.77	2.31	2.92	3.61	4.25	5.20	5.82	6.77	8.82	11.1

NOTE: For performance of double width, double inlet HV Fans (available in sizes No. 1½ and larger) multiply CFM x 2, RPM x 1.015, BHP x 2.1 and OV x 1.11.

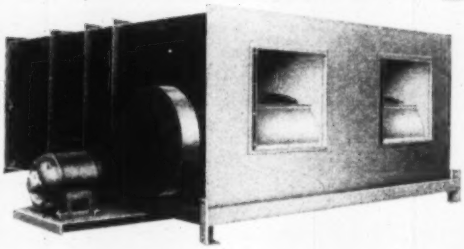
ABBREVIATED PERFORMANCE — TYPE NH FANS, SINGLE WIDTH, SINGLE INLET

Fan Size No.		30	33	36½	40	49	54	60	66	73	80½	89	98	108½
Wheel Dia.		15"	16½"	18¼"	20"	24½"	27"	30"	33"	36½"	40¼"	44½"	49"	54¼".
¼" S.P. 1000 O.V.	CFM	1270	1560	1900	2300	3450	4200	5150	6270	7650	9330	11410	13850	16920
	RPM	768	699	627	572	463	419	378	343	304	276	250	227	205
	HP	.093	.114	.13	.16	.24	.29	.36	.43	.53	.64	.79	.96	1.17
½" S.P. 1200 O.V.	CFM	1524	1872	2280	2760	4140	5040	6180	7524	9180	11196	13692	16620	20304
	RPM	988	899	806	735	595	539	486	441	391	355	321	291	263
	HP	.197	.242	.29	.35	.51	.62	.76	.93	1.12	1.36	1.67	2.02	2.47
¾" S.P. 1300 O.V.	CFM	1651	2028	2470	2990	4485	5460	6695	8151	9945	12129	14833	18005	21996
	RPM	1139	1036	932	850	688	624	562	510	452	410	371	337	305
	HP	.298	.367	.44	.53	.78	.95	1.16	1.41	1.70	2.07	2.53	3.07	3.76
1" S.P. 1400 O.V.	CFM	1778	2184	2660	3220	4830	5880	7210	8778	10710	13062	15974	19390	23688
	RPM	1276	1161	1047	955	774	700	631	573	508	461	417	378	342
	HP	.415	.510	.61	.73	1.08	1.31	1.61	1.96	2.37	2.89	3.54	4.29	5.25
1¼" S.P. 1500 O.V.	CFM	1905	2340	2850	3450	5175	6300	7725	9405	11475	13995	17115	20775	25380
	RPM	1403	1276	1152	1051	851	771	695	631	559	507	459	417	376
	HP	.546	.671	.80	.97	1.42	1.73	2.12	2.58	3.13	3.82	4.67	5.66	6.92
1½" S.P. 1600 O.V.	CFM	2032	2496	3040	3680	5520	6720	8240	10032	12240	14928	18256	22160	27072
	RPM	1522	1385	1251	1141	924	838	754	685	607	551	498	453	409
	HP	.693	.852	1.01	1.23	1.81	2.20	2.70	3.29	3.98	4.85	5.93	7.20	8.80

NOTE: For performance of double width, double inlet Type NH Fans (available in all sizes) multiply CFM x 2, RPM x 1.02, BHP x 2.08 and OV x 1.11.

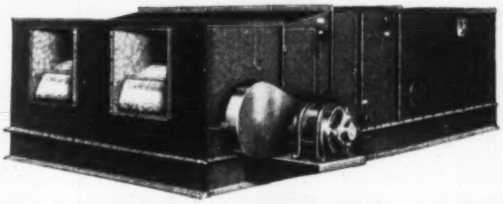
CLARAGE FAN COMPANY, Kalamazoo, Michigan

Clarage HEAVY-DUTY *Equipment*



BLOW-THRU MULTITHERM →
with zone control providing uniform conditioning results in various parts of building by compensating for variable heat and cooling loads.

MULTITHERM CONDITIONING UNIT
Horizontal type for ceiling or platform installation — vertical floor type units also available.



← **CAPILLARY CONDITIONING UNIT**
Horizontal type for ceiling or platform installation — vertical floor type capillary units also available.

AIR CONDITIONING UNITS

APPLICATIONS: Clarage Multitherms are ideal for industrial services, both comfort and process applications. Where products are weather-sensitive, they help speed production, insure uniform quality, decrease spoilage. Multitherms are equally suitable for conditioning offices, restaurants, stores, hospitals, etc.

The equipment cost is relatively low, and units can be installed as easily and inexpensively as unit heaters — **no drastic building alterations necessary.**

Multitherms can be furnished to provide all functions of year-round air conditioning, summer cooling, or winter conditioning only. Units are **extremely quiet** in operation. Aside from filter renewal and occasionally oiling the fan bearings, Multitherms require no attention summer or winter.

BLOW-THRU MULTITHERMS are conditioning units designed to maintain required temperatures and humidities in zones having different simultaneous loads.

A single unit is capable of air conditioning an **entire** medium size building providing in each zone, despite solar variations, wind velocities, etc., uniform air conditioning results; or different conditions in each zone as desired.

Zone control is accomplished by means of a separate pair of mixing dampers for each zone. One damper of each pair connects to a hot air plenum; the other to a cold air plenum. Each pair of dampers is so interconnected that one zone thermostat controls the hot and cold air mixture. Blow-Thru Multitherms are offered in 10 sizes with capacities ranging from 500 to 22,000 c.f.m.

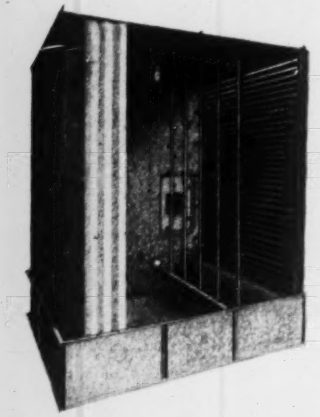
CAPILLARY AIR CONDITIONING UNITS are recommended where **exceptionally** thorough air cleaning, as well as temperature and humidity control, are required. They are used for both comfort and process applications.

The basic part of a capillary conditioning unit is the cell, each of which is a rectangular casing filled with an oriented mass of approximately 57,000 fine glass filaments. Capillary action, air flow and gravity combine to spread the spray water over each cell into a film exceeding 125 sq. ft. in area. Since minimum spray water is necessary and the sprays operate at low pressure, considerable savings in power and in initial cost of pumping equipment are effected. 7 sizes are available with basic capacities 1,800 to 20,000 c.f.m.

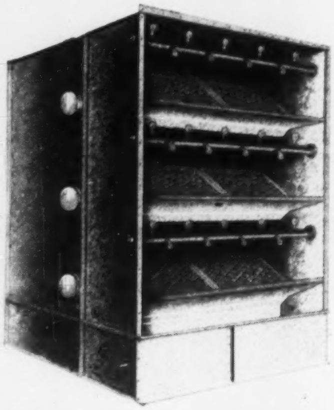
MULTITHERM PHYSICAL DATA

UNIT SIZE	CFM RANGE	Fan Outlet Area Sq. Ft.	FANS		Coil Face Area Sq. Ft.	Motor HP Range	FILTER SECTION DATA								
							Flat			Angle			Flat (Hi-Velocity)		
			No.	Size			No.	Size	Max. CFM	No.	Size	Max. CFM	No.	Size	Max. CFM
1205	500 — 1000	0.53	1	⅝	1.58	¼ — ½	1	20 x 25	1000				1	20 x 25	1500
1210	700 — 1600	1.13	1	⅞	2.63	¼ — 1	2	16 x 20	1280	2	20 x 25	2000	2	16 x 20	1920
1215	1500 — 2800	1.50	2	¾	4.73	¼ — 1½	2	20 x 25	2000	4	20 x 25	4000	2	20 x 25	3000
1820	1900 — 3700	2.26	2	⅞	6.05	¼ — 2	2	20 x 25	2000	4	20 x 25	4000	2	20 x 25	3000
1830	3000 — 5300	2.57	2	1	9.20	⅓ — 3	3	20 x 25	3000	6	20 x 25	6000	3	20 x 25	4500
1840	4000 — 7500	4.08	2	1¼	12.38	⅓ — 5	4	20 x 25	4000	8	20 x 25	8000	4	20 x 25	6000
2450	5000 — 9000	4.93	2	1⅜	15.10	½ — 5	8	16 x 20	5120	12	20 x 25	12000	8	16 x 20	7680
3060	6000 — 11000	5.80	2	1½	17.90	½ — 7½	6	20 x 25	6000	12	20 x 25	12000	6	20 x 25	9000
3680	8000 — 15000	7.87	2	1¾	24.76	¾ — 10	8	20 x 25	8000	16	20 x 25	16000	8	20 x 25	12000
4120	12000 — 22000	10.31	2	2	36.24	1½ — 15	12	20 x 25	12000	20	20 x 25	20000	12	20 x 25	18000

Clarage HEAVY-DUTY *Equipment*



SPRAY SYSTEM AIR WASHER
Offered in four different types as shown below.



CAPILLARY TYPE AIR WASHER
Designed for extremely thorough air cleaning and purification.

UNICOIL UNIT
Combining in single assembly all elements required for efficient heat transfer.

AIR WASHERS AND UNICOILS

APPLICATIONS: Clarage Spray Type Air Washers are recommended for comfort air conditioning, for dust removal and for product reclamation. They clean the air thoroughly, and provide a humidifying or dehumidifying effect as desired. As shown, 4 types are available. Capacities, based on 500-feet air velocity, range from 2,000 to 193,000 c.f.m.

FEATURES: Spray Type Washers are designed and built to give efficient, dependable service for many years. Operation and upkeep costs are extremely low, erection time is considerably below average, and all washer parts are readily accessible.

The spray systems utilize centrifugal type, bronze alloy nozzles. Friction losses through these nozzles are **low**, insuring an adequate pressure head for spray effect with minimum size recirculating pump and small power requirements.

Standard equipment includes an inspection door and inlet louvre. Pump controls and other accessories can be furnished. Spray Type Washers are built of galvanized steel to provide protection against corrosive action. Special constructions can be furnished.

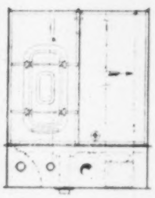
CAPILLARY AIR WASHERS are primarily used for industrial air conditioning services which require spray type equipment having **maximum air cleaning efficiency.** Basic parts are the capillary cells, each of which is a rectangular casing filled with approximately 57,000 fine glass filaments.

Capillary Air Washers require minimum spray water at low pressure. Savings in pump power cost and initial cost of pumping equipment are considerable. Sizes range from 4,400 to 132,000 c.f.m.

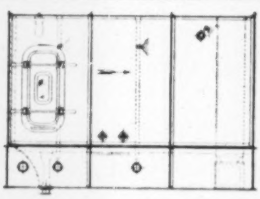
UNICOIL UNITS are a modern development for use as an integral part of a central station system for heating or cooling, or both; or for complete air conditioning in comfort applications. Unicoils are offered in a large range of sizes.

A standard unit consists of finned-copper coils, galvanized eliminator plates, galvanized settling tank and galvanized casing with inspection door.

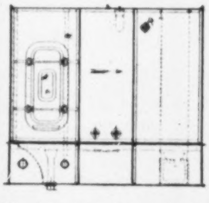
Here is ideal equipment to specify and install. It combines in one structure all elements necessary for efficient heat transfer. It eliminates assembling different parts on the job, thereby saving installation time and money.



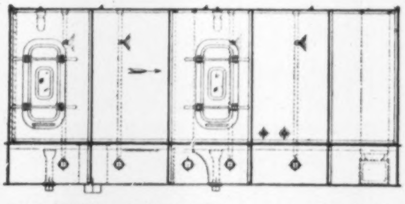
TYPE H: for air washing, purifying, and humidifying — the least expensive type. One main spray system, one set of eliminators. Length, 4 ft. 11 in.



TYPE CWW: for heavy duty humidifying, cooling and dehumidifying with cold or refrigerated water, or for condenser water cooling. Two main spray systems; one set of eliminators. Length, 8 ft. 10 in.



TYPE V: for washing, purifying and humidifying — a most efficient type. One main spray system; one set of eliminators with flooding spray. Length, 6 ft. 11 in.

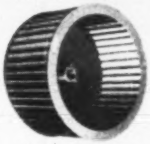


TYPE CWW — TWO STAGE: for cooling and dehumidifying with cold city or well water, industrial dust removal or material reclamation. Two main spray systems; one set of eliminators in each stage. Length, 14 ft. 0 in.

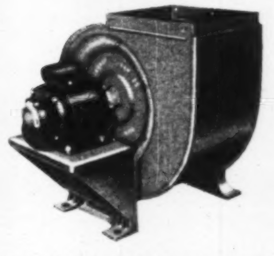
CLARAGE FAN COMPANY, Kalamazoo, Michigan

Clarage HEAVY-DUTY *Equipment*

High speed, non-overloading Ready Unit wheel.



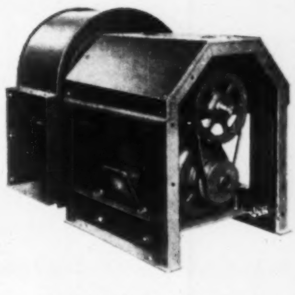
Slow speed, multiblade type Ready Unit wheel.



DIRECT DRIVE READY UNIT

Smaller sizes have cast iron housings — larger sizes have steel housings as shown here.

Ready Unit Ventilating Set equipped with Outdoor Covers for installation out-of-doors — covers easily removable.



V-BELT READY UNIT

This Clarage standard V-belt design provides protection to working parts — drive, motor and bearings within framework of unit.

READY UNIT VENTILATING SETS

APPLICATIONS: Ready Units are suitable for handling small ventilating supply and exhaust jobs of many types — widely used in laboratories, factories, offices, restaurants, radio stations, TV studios, homes, etc. They are noted for **quiet, economical performance.** 18 sizes are available with capacities 100 to 12,000 c.f.m.

CONSTRUCTION: All units are furnished **complete ready to run,** either equipped with AC or DC motors as required. They are built for both direct motor and V-belt drive as shown. Direct motor driven units have cast iron housings in the two smaller sizes; steel housings in the larger sizes. All V-Belt units have steel housings. Smaller size units are equipped with multiblade type wheels only; larger sizes with either multiblade or non-overloading wheels. Direct driven units have the fan wheel mounted on the motor shaft — no fan bearings necessary. V-belt units are furnished with graphite-bronze bearings that seldom require attention (oiling). Specially constructed units for handling corrosive gases and for other special conditions can be furnished.

All units can be equipped with Clarage Vortex (capacity) Control which has the low first cost advantage of a damper and the power saving feature of variable speed control.

OUT-DOOR INSTALLATIONS: Where it is essential or advantageous to locate the fan equipment out-of-doors, Ready Units can be furnished in all sizes to meet such requirements by the addition of Outdoor Covers to standard assemblies. These covers are built as shown with openings at the top for bearing lubrication, and are easily removable for access to bearings, motor and drive. Clarage Ready Units on outdoor installations give dependable, long-lasting service.

ABBREVIATED PERFORMANCE — DIRECT CONNECTED UNITS

Unit No.		H.P. Motor	Speed		CAPACITY IN CU. FT. PER MINUTE RESISTANCE (SP) W. G.					
					⅛"	¼"	⅜"	½"	¾"	1"
½ Half Width		1/20	850	cfm	141	20				
				ov	1620	229				
	*	1/8	1150	cfm	180	157	127			
				ov	2065	1800	1455			
	**	1/6	1725	cfm	287	275	259	245	210	
				ov	3290	3150	2970	2810	2410	
½ L.S.		1/20	850	cfm	242	41				
				ov	1200	209				
	*	1/8	1150	cfm	360	315	255			
				ov	1800	1600	1300			
	**	1/6	1725	cfm	575	550	518	490	420	
				ov	2900	2800	2630	2500	2100	
⅝ L.S.		1/20	850	cfm	515	450				
				ov	1690	1480				
	*	1/8	1150	cfm	735	680	625	560		
				ov	2400	2200	2050	1825		
	**	1/2	1740	cfm	1153	1130	1059	1040	970	885
				ov	3550	3480	3400	3380	3180	2850
¾ L.S.		1/4	860	cfm	975	875	765	640		
				ov	2000	1800	1575	1318		
	*	1/2	1150	cfm	1400	1300	1225	1135	965	785
				ov	2882	2675	2520	2337	1990	1616
	**	1 1/2	1740	cfm	2180	2100	2060	1990	1890	1780
				ov	4490	4325	4242	4100	3892	3660
⅞ H.S.		1/20	850	cfm	550	365	110			
				ov	830	552	167			
	*	1/8	1150	cfm	825	710	575	400		
				ov	1125	1072	870	605		
	**	1/3	1725	cfm	1335	1270	1190	1110	940	730
				ov	2010	1920	1800	1690	1420	1105
1 H.S.		1/8	850	cfm	875	685	455	120		
				ov	1015	793	528	139		
	*	1/6	1150	cfm	1275	1145	1000	835	435	
				ov	1475	1327	1158	967	504	
	**	3/4	1740	cfm	2010	1940	1860	1780	1600	1390
				ov	2315	2223	2153	2031	1850	1612
1⅛ H.S.		1/8	860	cfm	1310	1110	865	575		
				ov	1193	1005	788	524		
	*	1/3	1150	cfm	1860	7020	1580	1400	1000	530
				ov	1694	1570	1440	1276	912	483
	**	1	1740	cfm	2930	2850	2760	2665	2475	2245
				ov	2670	2600	2517	2430	2255	2050
1¼ M.S.		1/4	860	cfm	1595	1470	1300	1110		
				ov	1186	1095	967	825		
	*	1/3	1150	cfm	2175	2130	2050	1940	1690	1400
				ov	1615	1585	1525	1445	1255	1040
	**	1 1/2	1740	cfm	3305	3290	3280	3240	3130	2980
				ov	2460	2445	2440	2410	2330	2217
1½ M.S.	*	1/2	860	cfm	2950	2875	2760	2625	2250	
				ov	1525	1485	1425	1355	1162	
	**	1	1150	cfm	4050	3965	3900	3850	3660	3430
				ov	2095	2050	2015	1990	1890	1770
1¾ M.S.	*	1	860	cfm	4725	4525	4520	4400	4075	3590
				ov	1795	1750	1720	1670	1550	1365

Units marked * are moderately quiet. Units not starred are very quiet in operation. Units marked ** are not quiet and only should be used for industrial applications.

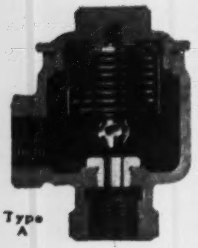
CLARAGE FAN COMPANY, Kalamazoo, Michigan

W. H. NICHOLSON & COMPANY

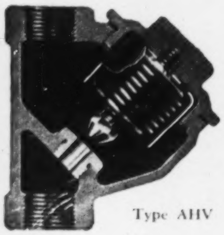
198 OREGON STREET STOCKS OF STEAM TRAPS CARRIED BY AGENTS IN ALL PRINCIPAL CITIES **WILKES-BARRE, PA.**

NICHOLSON INDUSTRIAL STEAM TRAPS

NICHOLSON INDUSTRIAL STEAM TRAPS have many important and exclusive features which make them ideal for draining condensate from all types of steam heating and processing equipment.


Type A

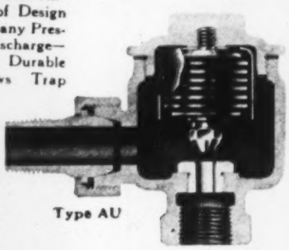
Recommended for the individual drainage of Unit Heaters, Radiators, Pipe Coils, Steam Mains, Drips, Hot Water Heaters, Driers, Jacketed Kettles, Cookers, Coffee and Hot Water Urns, Dish Heaters, Vegetable Steamers, Bakers' Proof Boxes, Steam Tables, Dry Kilns, Plastic Moulding Platens, Sterilizers, Ironers, Presses, Mangles, etc.


Type AHV

Large Capacity — No Air-Binding—Freeze Proof Design—No Adjustment for any Pressure—Intermittent Discharge—Strongest and Most Durable Thermostatic Bellows Trap Manufactured.

Types A, AHV and AU

For Pressures From Vacuum to 200 lbs. Bronze Construction —Aluminum Painted.


Type AU

***Maximum Capacity in Pounds per Hour at Various Pressures— Types A, AHV and AU**

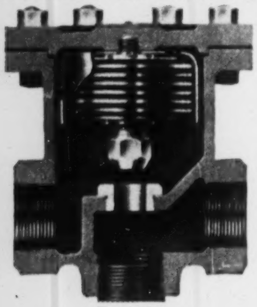
Size, Inches	1 Lb.	2 Lbs.	5 Lbs.	10 Lbs.	15 Lbs.	20 Lbs.	40 Lb.
¼—⅜	865	1,220	1,915	2,695	3,290	3,780	5,290
½—¾	865	1,220	1,915	2,695	3,290	3,780	5,290
1	1,020	1,440	2,270	3,190	3,900	4,475	6,250

Size, Inches	50 Lbs.	60 Lbs.	80 Lbs.	100 Lbs.	125 Lbs.	150 Lbs.	175 Lbs.	200 Lbs.
¼—⅜	5,885	6,400	7,310	8,120	8,925	9,775	10,400	11,090
½—¾	5,885	6,400	7,310	8,120	8,925	9,775	10,400	11,090
1	6,955	7,590	8,660	9,600	10,570	11,590	12,310	13,100

List Prices—Types A, AHV and AU

Size, Inches	Types A and AHV			Type AU			Valve Orifice, Inches
	With Bellows of			With Bellows of			
	Bronze	Monel	Stainless	Bronze	Monel	Stainless	
¼—⅜—½	$17 60	$20 90	$24 90	$19 05	$22 40	$26 40	5/16
¾	19 05	22 40	26 40	20 50	23 85	27 85	5/16
1	21 30	23 65	28 65	23 45	26 80	30 80	23/64

Types A, AU and C are made in angle type only, with horizontal inlet and vertical outlet—Type AU has union connection on inlet. All three types drain completely when cold and will not freeze. Type AHV especially applicable to drainage problems where necessary or desirable to have all piping run horizontally or vertically, or close to floor, wall or pillar. Type B, made with horizontal inlet and optional horizontal or vertical outlet offers either angle or horizontal straight-through connections. Types AHV and B traps are not freeze-proof.


Type B

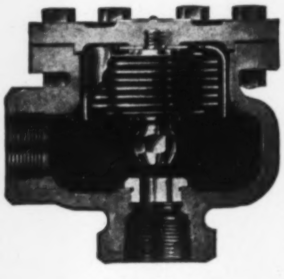
Types B and C

For Pressures from Vacuum to 250 lbs.—Types B & C—Semisteel Construction—Aluminum Painted.

For Pressures to 300 lbs. with Superheat — Type C Traps only — Cast Steel Construction with Stainless Steel Bellows.

List Prices—Types B and C

Size, Inches	Types B and C			Type C Only		Valve Orifice, Inches
	Semisteel With Bellows of			Cast Steel With Bellows of		
	Bronze	Monel	Stainless	Monel	Stainless	
½	$25 85	$29 20	$33 70	$41 35	$45 45	3/8
¾	33 90	38 30	45 25	53 70	60 30	7/16
1—1¼	40 40	43 95	50 15	63 00	69 65	1/2
1½—2	59 80	64 45	71 10	91 00	97 65	3/4


Type C

***Maximum Capacity in Pounds per Hour at Various Pressures—Types B and C**

Size, Inches	1 Lb.	2 Lbs.	5 Lbs.	10 Lbs.	15 Lbs.	20 Lbs.	40 Lbs.	50 Lbs.	60 Lbs.	80 Lbs.	100 Lbs.	125 Lbs.	150 Lbs.	175 Lbs.	200 Lbs.	225 Lbs.	250 Lbs.	C. Steel 300 Lbs.
½	1,140	1,610	2,530	3,560	4,350	4,990	6,980	7,775	8,460	9,660	10,720	11,800	12,920	13,750	14,640	15,380	16,090	17,400
¾	1,695	2,385	3,760	5,290	6,450	7,420	10,350	11,540	12,560	14,350	15,910	17,500	19,190	20,400	21,720	22,800	23,870	25,820
1—1¼	2,120	2,985	4,700	6,610	8,070	9,260	12,960	14,430	15,710	17,930	19,900	21,880	23,980	25,500	27,200	28,500	29,850	32,300
1½—2	3,200	4,510	7,100	9,990	12,200	14,000	19,600	21,800	23,750	27,120	30,100	33,100	36,300	38,600	41,100	43,200	45,150	48,900

***Capacities shown are maximum for average operating conditions with valve orifice wide open for one hour. To prevent continuous trap operation or condensate back-up, traps should be selected which have capacities from two to ten times the expected normal condensation load, using the lower factor when all operating conditions are favorable, and varying from that figure up to the highest factor, depending on quantity and severity of adverse conditions encountered.**

FEATURES

FOR COMPLETE DETAILS regarding Nicholson Industrial Steam Traps send for BULLETIN 152

LARGE CAPACITY—From two to six times greater valve area and capacity than average traps.

NO AIR-BINDING—All types discharge air just as efficiently as condensate. May be used as air vents for mechanical traps, return traps, receivers, water heaters, etc.

NO DRIBBLING—Intermittent action of water-sealed discharge valve—Wide open when trap is cold—Closes immediately when steam contacts bellows.

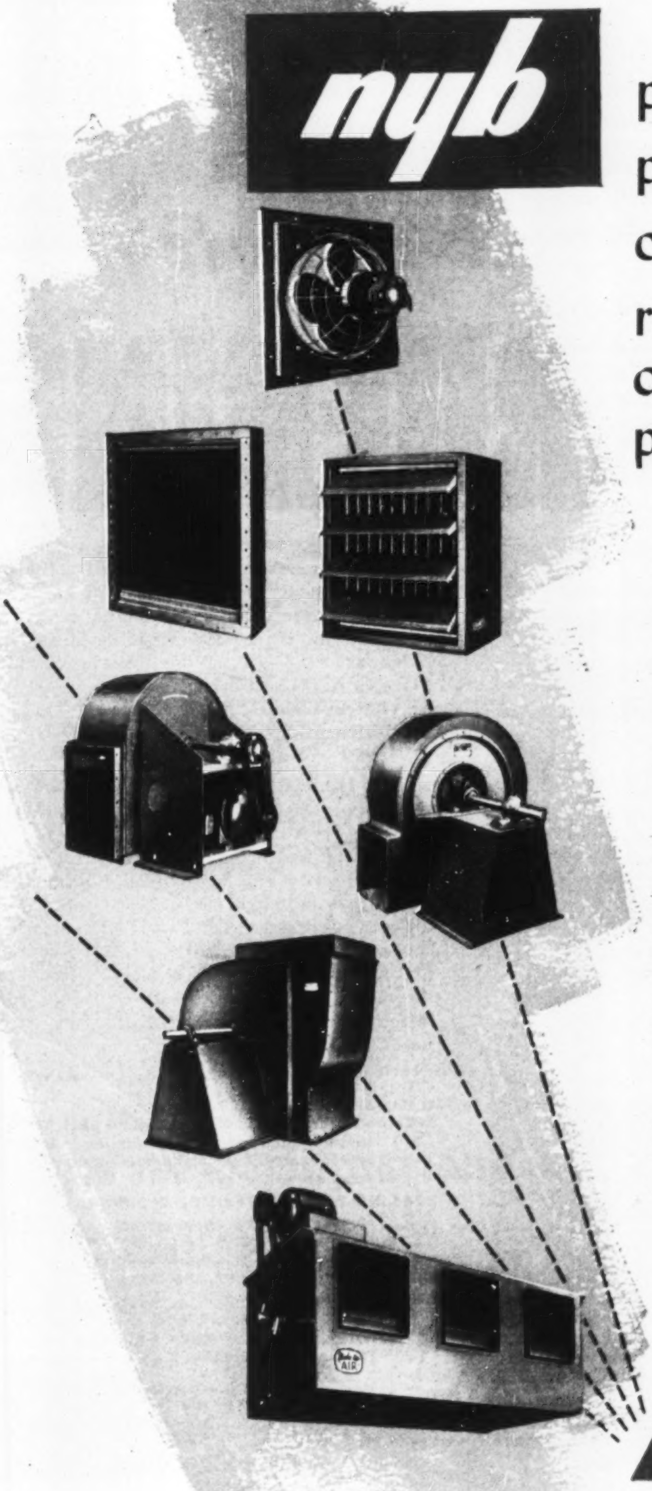
NO FREEZE-UPS—Types A, AU and C completely drain when cold and will not freeze on out-door applications.

NO ADJUSTMENT—Same size valve and seat requiring no change or adjustment for any pressure from vacuum to the maximum allowable with construction used. Traps may be moved from low to high pressure applications, or vice versa.

NO WATER-LOGGED UNITS—Requires but a few degrees temperature differential between steam and condensate to open valve—Low cost and small size make individual trapping possible and economical.

CONSTRUCTION FEATURES—Renewable hardened stainless steel valves and seats—Large diameter phosphor bronze bellows hydraulically formed from seamless tube, with brazed naval brass end fittings, furnished in traps of bronze and semisteel construction—Stainless Steel bellows, electric resistance steam welded to 18-8 stainless end fittings, furnished in cast steel traps; also available at extra cost with bronze and semisteel traps, for bad water conditions.

Other Products—Piston and Weight Operated Steam Traps, Compressed Air Traps, 3 and 4-Way Cylinder Control Valves, Steel and Stainless Steel Floats, Etc.



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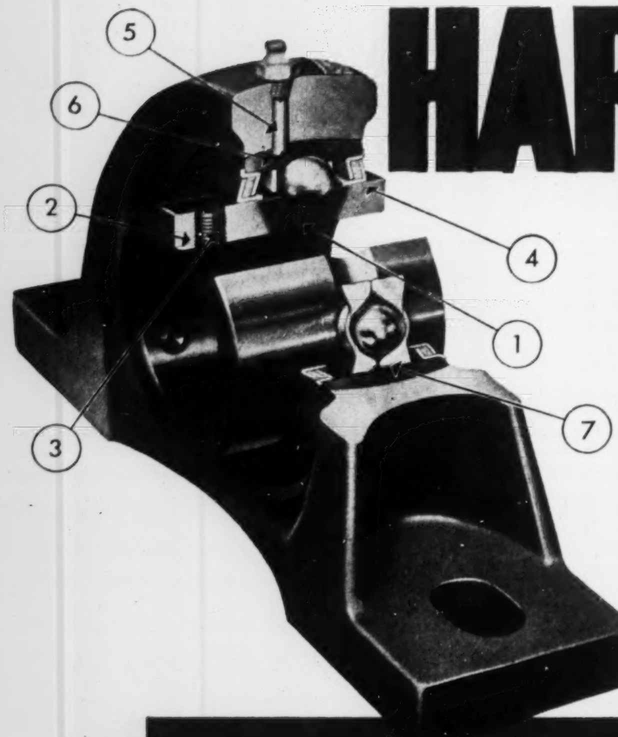
Another

SEALMASTER

First ... **ZONE HARDENING***



SEALMASTER first introduced the self-aligning, permanently-sealed, industrial ball bearing unit ... the outer race locking pin ... the ball retainer riding the inner surface of the outer race ring—all patented features of SEALMASTER Ball Bearing Units. NOW ... SEALMASTER INTRODUCES ANOTHER MAJOR ADVANCEMENT—*ZONE HARDENING.*

ZONE HARDENING hardens the ball path section of the inner race ring by induction heating (See 1 in cutaway view). The extended part of the inner race is left in its original, metallurgically soft state. The hardened set screws are mounted through the soft part of the extended race (See 2 and 3), permitting race-to-shaft locking with increased holding power and greater resistance to shock and vibration. Firm lock of bearing to shaft minimizes danger of fretting corrosion and eliminates shaft wear.

OTHER **SEALMASTER** *FIRSTS*

PERMANENTLY SEALED, SELF-ALIGNING BALL BEARING
... has felt-lined steel flingers rotating in labyrinth to prevent entry of dirt and to retain proper amount of lubricant (see 4).

LOCKING PIN AND PERIMETER DIMPLE
... prevents bearing from spinning in its housing and prevents fretting corrosion between housing and bearing, yet permits sufficient shaft alignment without seal distortion (See 5 and 6).

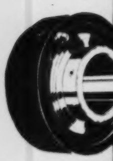
BALL RETAINER
... rides on the ground inner surface of the outer race ring (See 7), eliminates ball wear, trapping grease and preventing its churning in the bearing.

SEALMASTER Units are available in many special housings as well as in the complete standard line. Write us for full details on special units. Ask for a copy of SEALMASTER Catalog 845.

*Patented—exclusively SealMaster's

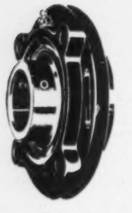
SEALMASTER

BALL BEARING UNITS


Cartridge Unit

Flange Unit

Take-Up Unit


Flange-Cartridge Unit

SEALMASTER BEARINGS

47 RIDGEWAY AVENUE, AURORA, ILLINOIS

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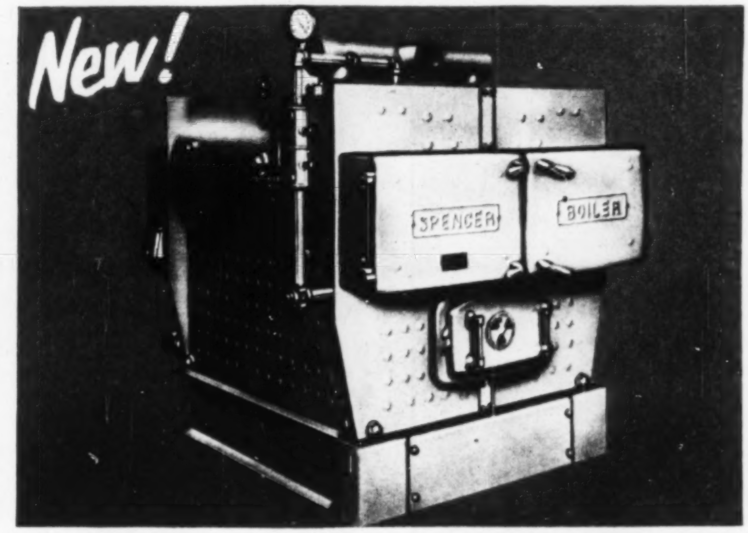
with a wide selection of boilers in more than 70 adaptable models and sizes. There's a Spencer for every building . . . for every fuel!

IN THE COMMERCIAL FIELD, Spencer offers an ingenious new design like this—



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Flattened out to beat low headroom problem!

Divided for easier entrance through basement openings. Yet two watertight sections need no welding for installation!

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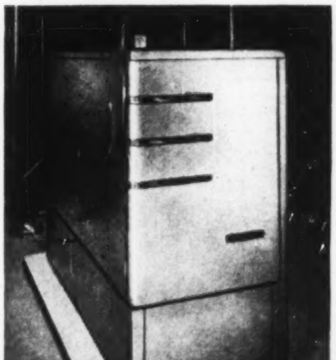
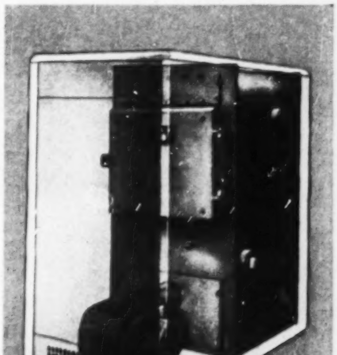


SPENCER'S "C" SERIES—Modern steel heating boiler—smartly styled jacket, standard or extended—9 sizes ranging from 570 to 3000 sq. ft., steam—three-pass type boiler—heavy-duty doors—water-cooled frames.

SPENCER "R" SERIES—Steel heating boiler—6 sizes ranging from 320 to 1100 sq. ft., steam—peaked firebox for more efficient combustion—staggered boiler tubes for quick heat transfer—comes in standard or extended beauty jacket.



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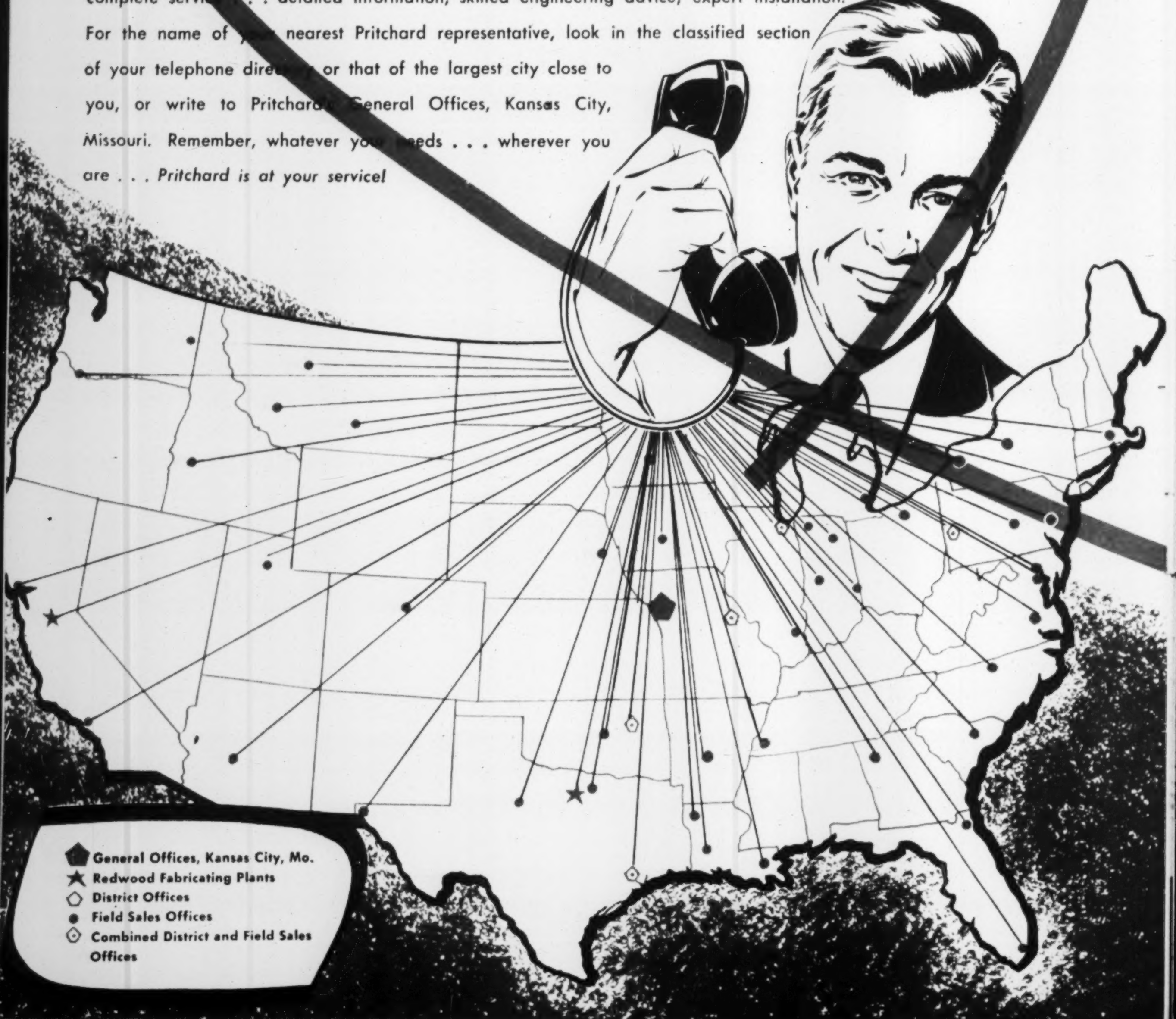
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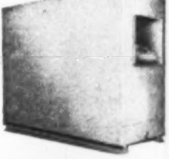
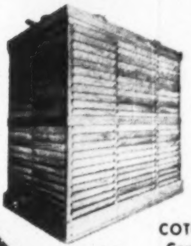


COTOPACK® Series "PC"
Capacities: 5 to 50 tons

Medium...



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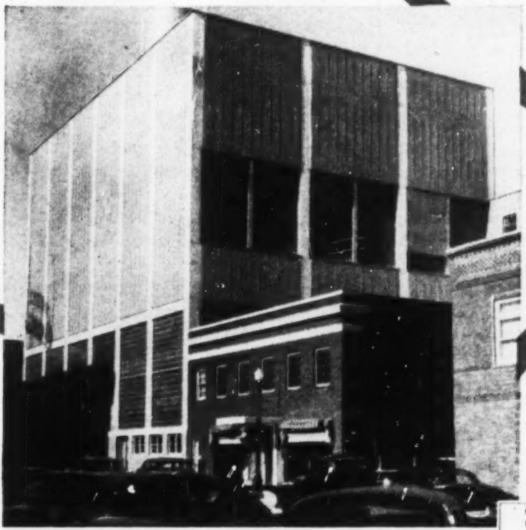

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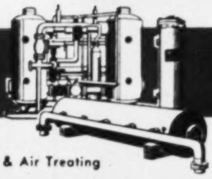
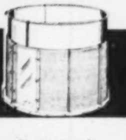


Gas & Air Treating



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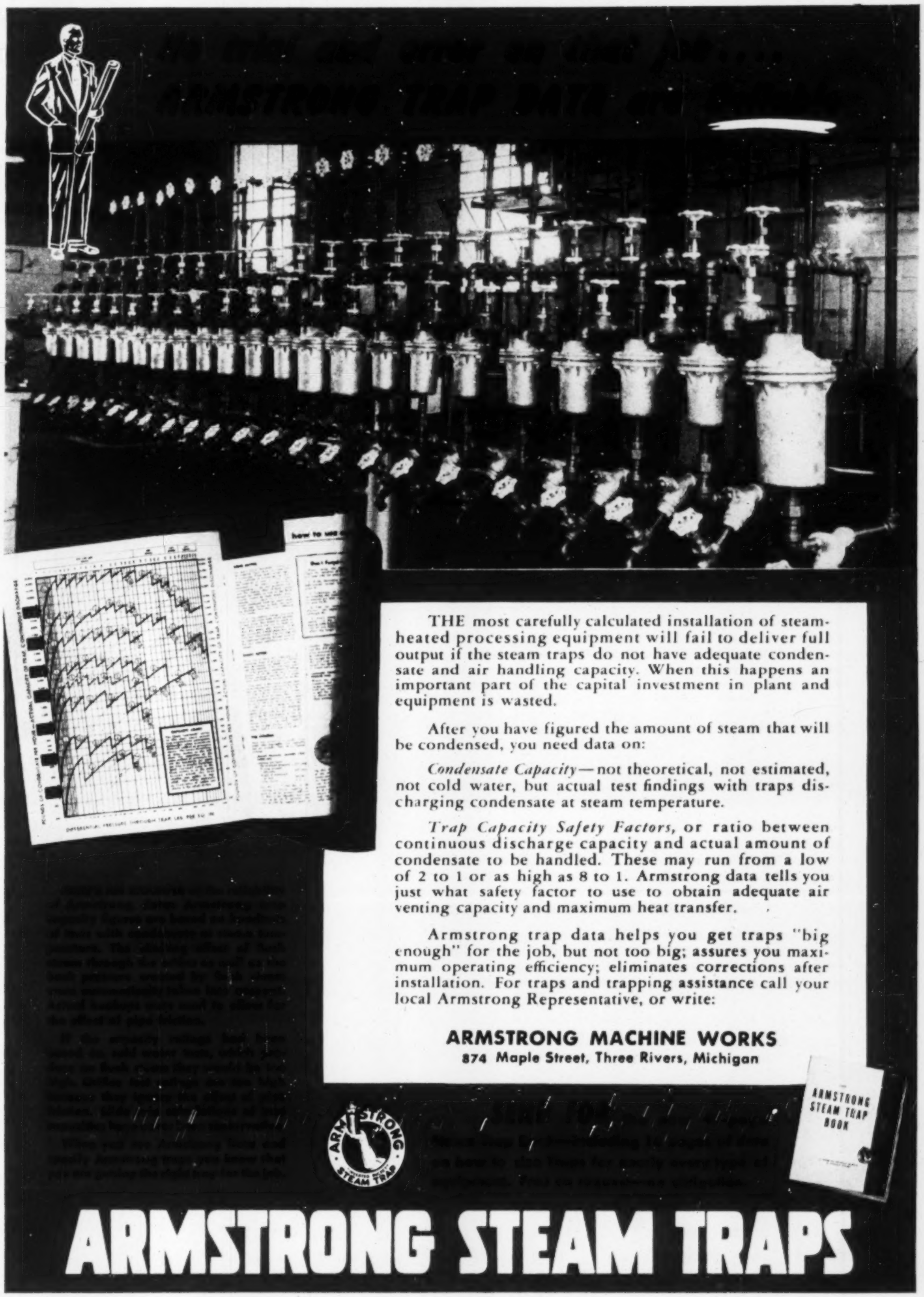
TULSA · YOUNGSTOWN

UNITED STATES STEEL


No trial and error on that job....
ARMSTRONG TRAP DATA [illegible]
how to use
DIFFERENTIAL PRESSURE THROUGH TRAP LBS PER SQ IN
ARMSTRONG STEAM TRAP BOOK

THE most carefully calculated installation of steam-heated processing equipment will fail to deliver full output if the steam traps do not have adequate condensate and air handling capacity. When this happens an important part of the capital investment in plant and equipment is wasted.

After you have figured the amount of steam that will be condensed, you need data on:

Condensate Capacity—not theoretical, not estimated, not cold water, but actual test findings with traps discharging condensate at steam temperature.

Trap Capacity Safety Factors, or ratio between continuous discharge capacity and actual amount of condensate to be handled. These may run from a low of 2 to 1 or as high as 8 to 1. Armstrong data tells you just what safety factor to use to obtain adequate air venting capacity and maximum heat transfer.

Armstrong trap data helps you get traps "big enough" for the job, but not too big; assures you maximum operating efficiency; eliminates corrections after installation. For traps and trapping assistance call your local Armstrong Representative, or write:

ARMSTRONG MACHINE WORKS
874 Maple Street, Three Rivers, Michigan

Here's the evidence of the reliability of Armstrong data: Armstrong trap capacity figures are based on hundreds of tests with condensate at steam temperatures. The choking effect of flash steam through the orifice as well as the back pressure created by flash steam [illegible] below trap [illegible]. Actual hookups were used to allow for the effect of pipe friction.

If the capacity ratings had been based on cold water tests, which give free flash steam they would be too high. Other [illegible] ratings are too high because they ignore the effect of pipe friction. [illegible]

When you use Armstrong data and specify Armstrong traps you know that you are getting the right trap for the job.

SEND FOR [illegible]

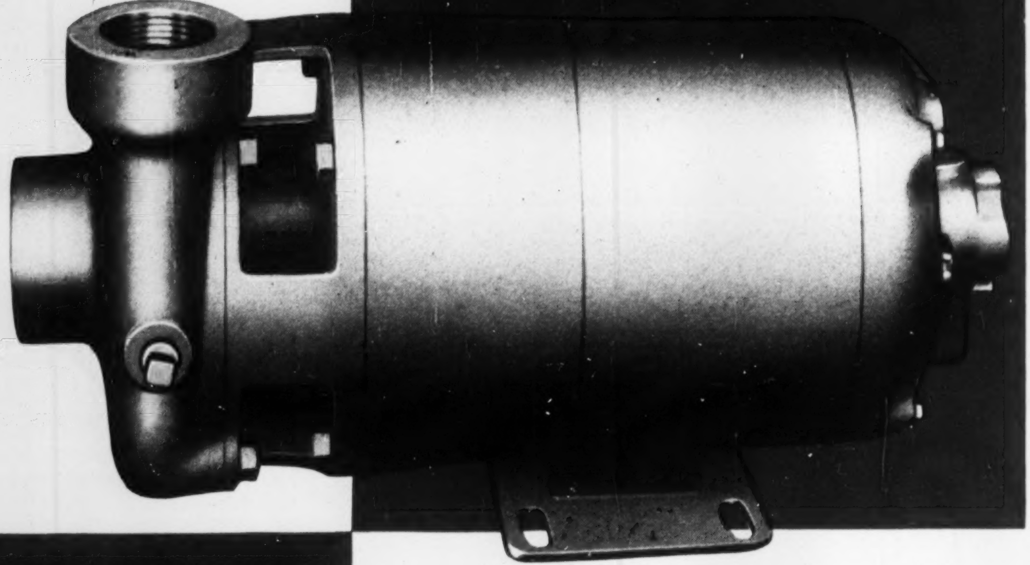
[illegible] Trap Book—including 44 pages of data on how to size traps for nearly every type of application. Free on request—no obligation.

ARMSTRONG STEAM TRAPS

For all three

1. **ECONOMY**
2. **PERFORMANCE**
3. **COMPACTNESS**

CARVER MODEL B
AIR CONDITIONING
ELECTROPUMPS



- ***Mechanical Shaft Seals***
- ***Stainless Steel Shafts***
- ***Enclosed Bronze Impellers***
- ***Rotatable Volute Casings***
- ***Grease-Sealed Heavy-Duty Ball Bearings***
- ***Top Quality Motors***
- ***Capacities up to 70 G.P.M. Heads up to 110 feet***
- ***Two Sizes: 1" and 1-1/4" Discharge***

NEW, modern design brings you these outstanding construction features in pumps that *fit right into* your air conditioning and refrigeration applications with ease and economy.

These versatile Carver Model B Electropumps are durable, efficient pumps, close-coupled to high-grade continuous-duty, jet pump motors of standard NEMA dimensions. Though compact in size, and very reasonable in cost, they are built for continuous hard service and backed by CARVER'S one year guarantee. Your best buy for better performance in every way.

Carver's broad line of centrifugal pumps includes many sizes and types (end-suction, split-case, self-priming) in capacities up to 4000 G.P.M., pressures up to 125 lbs.

Ask for Bulletin No. 211

CARVER PUMP COMPANY

1460 Hershey Ave., Muscatine, Iowa

CARVER

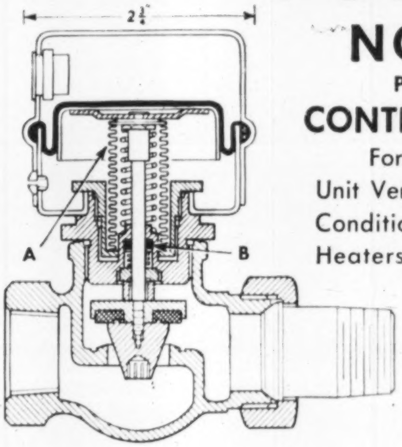
CARVER PUMPS

[illegible] No. 105 at the Air Conditioning Show

New! Look what Powers has done to **Modernize** Control Valves

Powers NO-PAK Valves Banish Packing Maintenance Prevent leakage of water or steam or loss of vacuum

POWERS



NO-PAK

Pneumatic

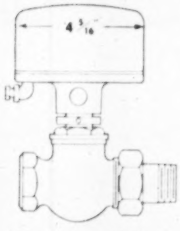
CONTROL VALVES

For Convectors,
Unit Ventilators, Unit Air
Conditioners, Baseboard
Heaters, Radiators, etc.

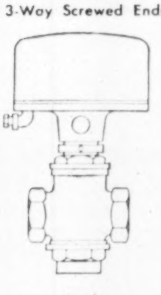
Various Types
and Sizes for
all requirements

Real ECONOMY — year after year!

Another POWERS Contribution to Better Heating and Air Conditioning Control



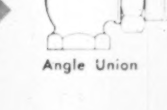
Straightway Union
3-Way Screwed Ends



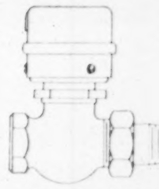
NO-PAK valves with their many advantages are now standard with Powers temperature control systems. Their superior performance is due to Duo-Seal construction.

Bronze Packless Bellows (A) in sectional view above, is the primary seal which eliminates packing maintenance — packing friction — steam and water leakage or loss of vacuum. It is designed to withstand pressure up to 150 psi. Maximum valve stroke is only two-thirds of the normal bellows stroke. A spring loaded secondary seal (B) permits servicing of valve top without draining the water system or shutting down the steam heating system. Seal is made of highly elastic neoprene and is ready to act at any time. Small contact between seal and the highly polished stainless steel stem makes friction a negligible factor.

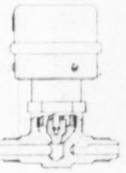
For utmost dependability and lowest cost maintenance specify control by Powers NO-PAK Valves.



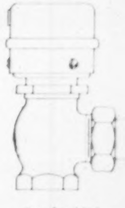
Angle Union



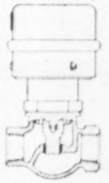
Straightway Union



Flared Ends

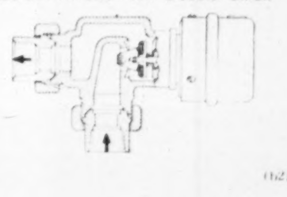


Angle Union



← Screwed Ends

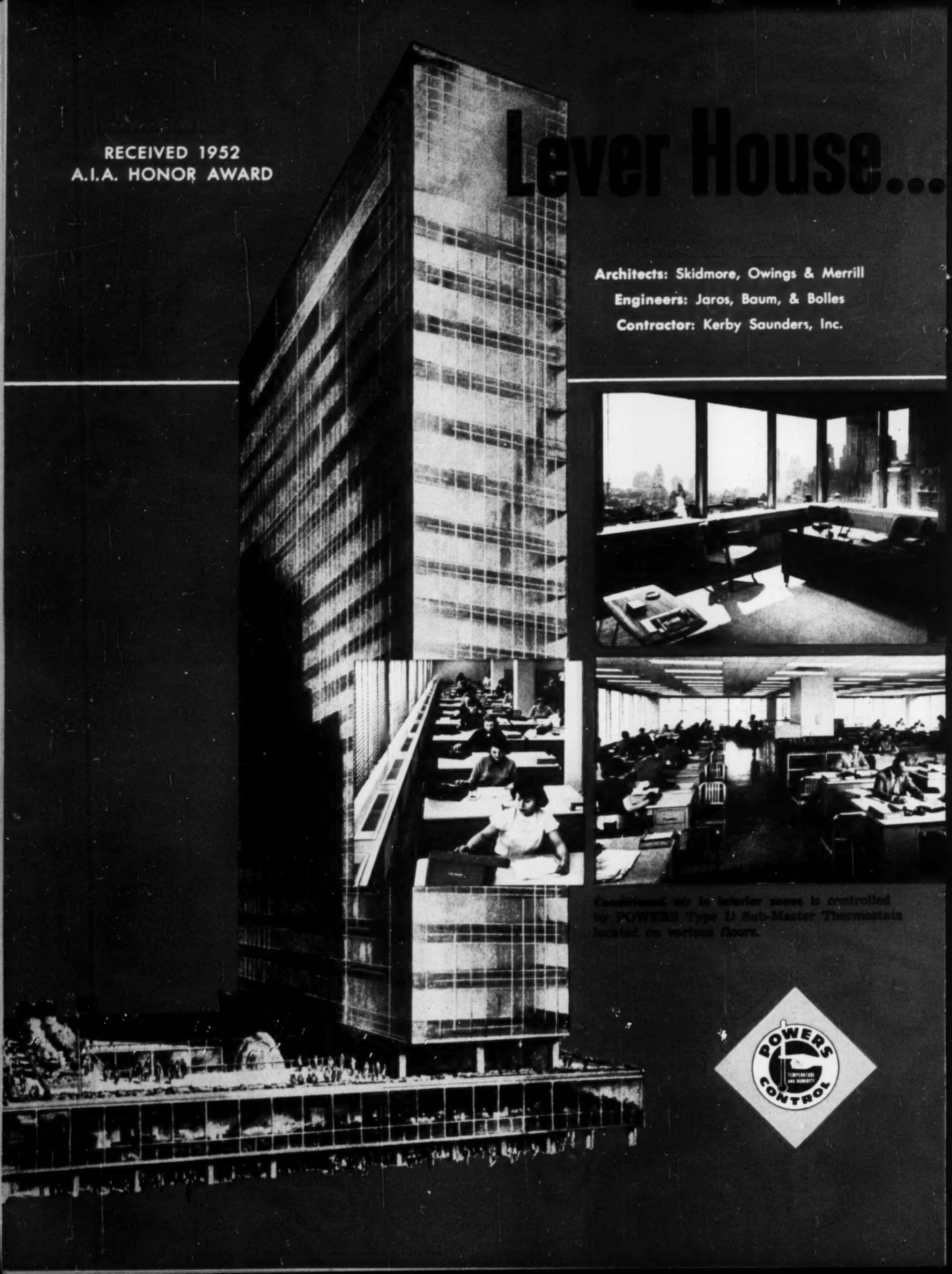
Below: Reverse Flow Double Union



POWERS CONTROL

(62)

Established in 1891 · THE POWERS REGULATOR COMPANY · SKOKIE, ILL. · Offices in Over 50 Cities


POWERS
TEMPERATURE AND HUMIDITY
CONTROL

RECEIVED 1952
A.I.A. HONOR AWARD

Lever House...

Architects: Skidmore, Owings & Merrill
Engineers: Jaros, Baum, & Bolles
Contractor: Kerby Saunders, Inc.

Conditioned air in interior zones is controlled by POWERS Type D Sub-Master Thermostats located on various floors.

another New York landmark equipped with

POWERS

Pneumatic System of

AIR CONDITIONING CONTROL

Individual selection of desired temperature in each office and other spaces at Lever House provides year 'round comfort with important benefits of increased employee efficiency, less fatigue, absenteeism, illness, and lower cleaning costs.

Air conditioning here is by means of a split system — individual units shown below, for the glazed periphery of the building are fed with high pressure filtered and humidified air and heated or chilled water. In the center of the office space high velocity conditioned air is distributed thru ceiling diffusers.

Right-temperatured-air at proper humidity is assured at all times by a Powers pneumatic control system. Only a few of its important controls are shown below, most are "behind the scenes" performing their tasks with unfailing dependability.

Other Prominent POWERS Installations

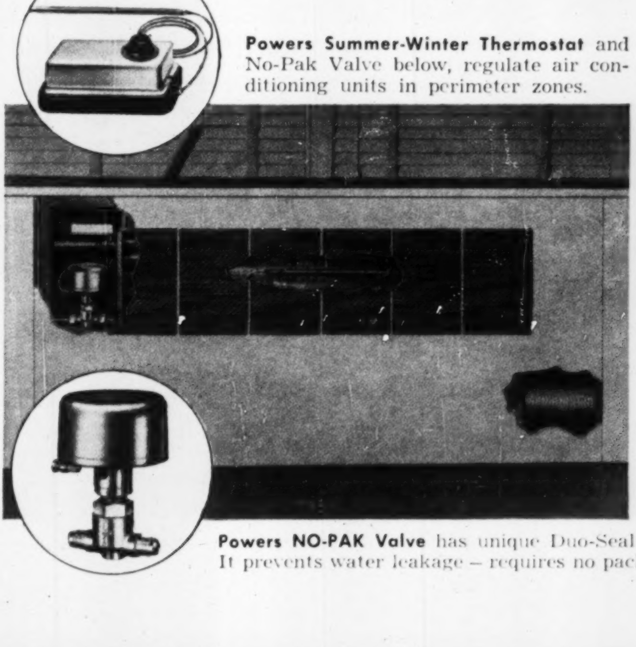
United States Capitol Building
UN General Assembly and Conference Buildings
New York Stock Exchange • Columbia Medical Center
Madison Square Garden • Radio City Music Hall
New York Times • Manhattan House • Esso Building
Harvard University • Massachusetts Inst. of Technology
Prudential Insurance Co. • Anheuser Busch Inc. Newark
Esso Research Center, Linden, N. J.
New York City Veterans Administration Hospital
Washington National Airport • LaGuardia Airport

Experience we have gained in many installations such as these may be helpful to you. When problems of temperature or humidity control arise contact POWERS nearest office, there's no obligation.

THE POWERS REGULATOR COMPANY

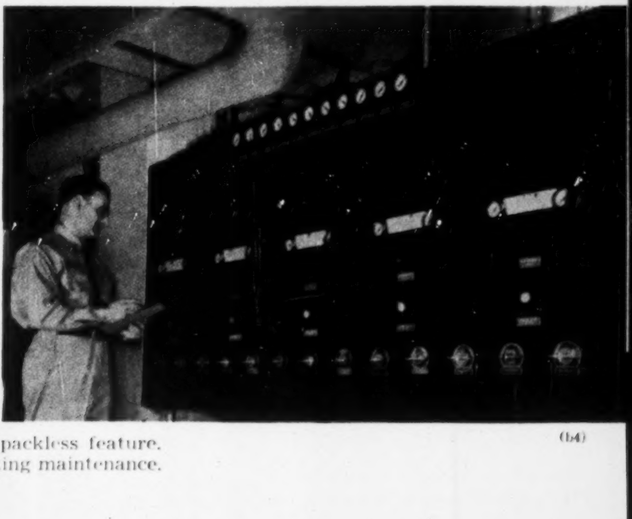
Over 60 Years of Automatic Temperature and Humidity Control
Skokie, Ill., Offices in Over 50 Cities, see your phone book

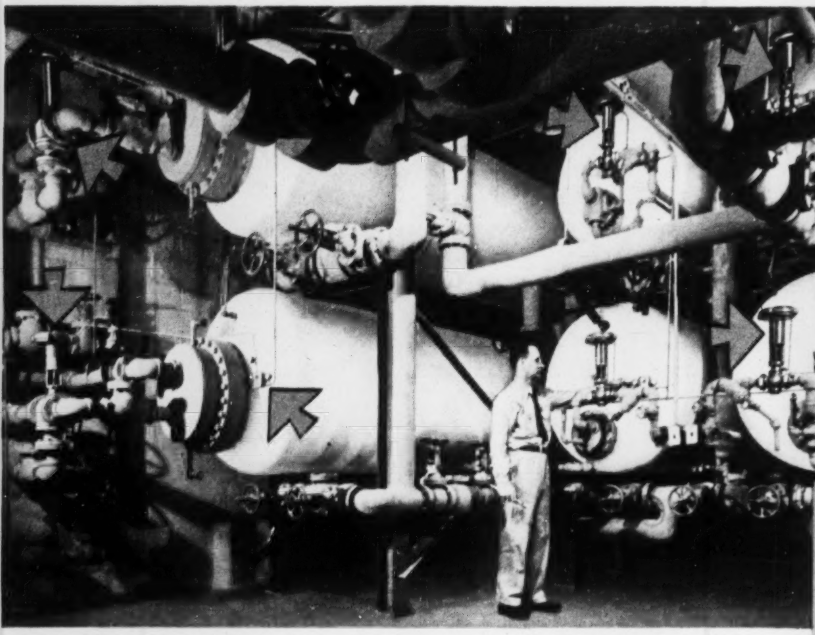
Powers Summer-Winter Thermostat and No-Pak Valve below, regulate air conditioning units in perimeter zones.



Powers NO-PAK Valve has unique Duo-Seal packless feature. It prevents water leakage — requires no packing maintenance.

Powers Master Control Panel for primary air and water circuits plays an important part in the efficient regulation of the air conditioning system.





WATER HEATERS AT LEVER HOUSE New York City

Architects: Skidmore, Owings & Merrill

Consulting Engineers: Jaros, Baum & Bolles

Contractor: Gillman-Rous-Pesce Corp.

LUX
TOILET SOAP

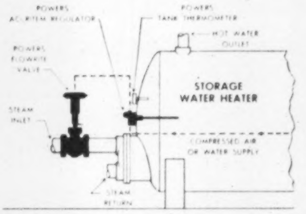
One of Lever Brothers Co. Famous Soaps

Chief Engineer Edward MacDonald states "Performance of Powers Accritem Temperature Regulators has been highly satisfactory on the 6 water heaters shown above as well as on booster heater for dishwasher and for controlling cooling of condensate before discharge to sewer."

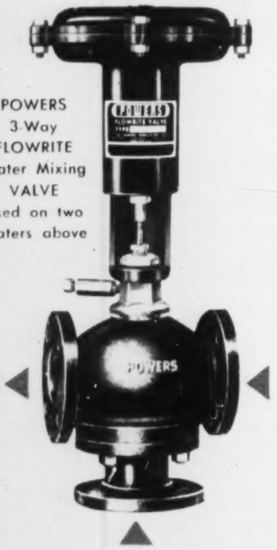
POWERS
ACCRITEM

®POWERS ACCRITEM REGULATORS Used at LEVER HOUSE

Unsurpassed for reliability and power to operate large or small diaphragm valves controlling Water Heaters, Heat Exchangers, Jacket Water Cooling for Diesel Engines or Air Compressors and many Industrial Processes.



Water heaters in more and more prominent buildings are being equipped with ACCRITEM Regulators because of their many advantages listed below. When you want thermostatic control for water heaters, heat exchangers, individual or gang showers, hydrotherapy, jacket cooling water for compressors, diesel engines, or a Cyclotron call Powers. No other firm has such a complete line of dependable water temperature control.



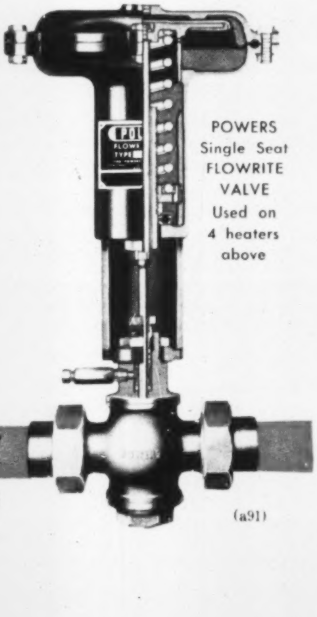
POWERS 3-Way FLOWRITE Water Mixing VALVE Used on two heaters above

Important ACCRITEM Features that Give Better Control with Less Maintenance

- ***Adjustable Sensitivity*** and over-heat protection.
- ***Calibrated Dial*** temperature adjustment.
- ***Simple, Rugged Construction*** withstands vibration and insures years of reliable service.
- ***Temperature Ranges*** 50-250° F. and 150-350° F.
- ***Easy to Install.*** Requires 15 lb. supply of compressed air or water for its operation.
- ***Small Size***—regulator head is only 2⅞" x 3⅝", sensitive bulb is 12" long with ½" I. P. S. connection.

Bulletin 316 gives full details

Call Powers for aid with your problems of temperature control. Our more than 60 years of experience may be helpful to you. Whether you want a simple self-operated regulator or thermostatic water mixing valve or a pneumatic control system with recording controllers...contact Powers.

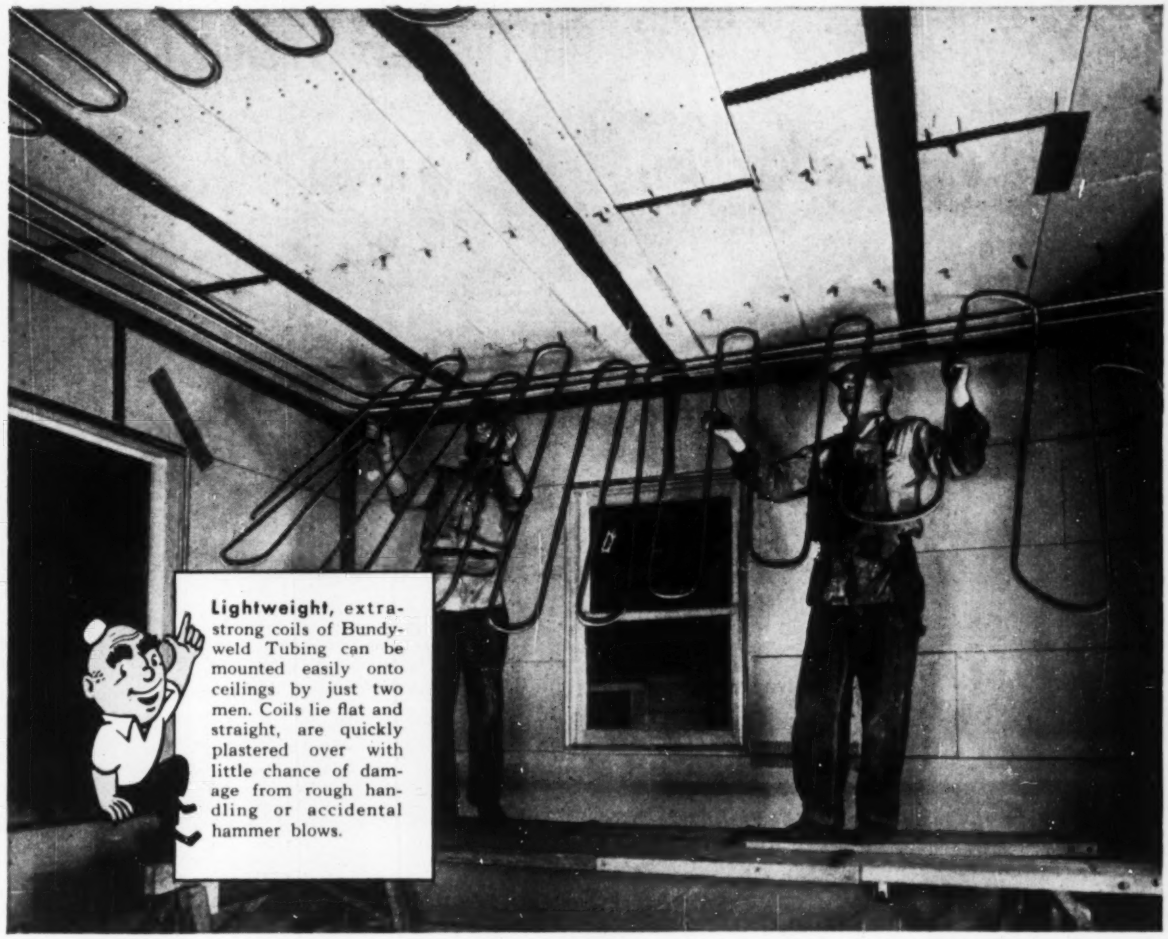


POWERS Single Seat FLOWRITE VALVE Used on 4 heaters above

THE POWERS REGULATOR COMPANY

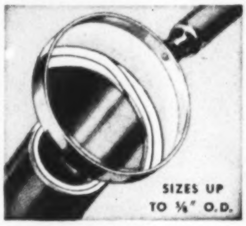
Skokie, Ill. • Offices in Over 50 Cities, See your phone book • Established 1891

(a91)



Lightweight, extra-strong coils of Bundyweld Tubing can be mounted easily onto ceilings by just two men. Coils lie flat and straight, are quickly plastered over with little chance of damage from rough handling or accidental hammer blows.

Leave your competition in the lurch: check into Bundyweld Ceiling Radiant Heating



Key to Low Cost

Bundyweld is the only tubing double-walled from a single strip, copper-brazed through 360° of wall contact. It's leakproof, thinner walled, yet stronger. It transmits heat quickly, has high bursting strength. It saves on material costs and installation time.

Standard 20′ lengths of Bundyweld are easily formed into coils in shop or on job site. Expanded ends (furnished when specified) are quickly soldered into leakproof union. Joined, lightweight coils are easily mounted onto ceiling, quickly plastered over.

Here's a sure way to step right out in front of your competition and *stay* in front.

Take on Bundyweld Ceiling Radiant Heating. Here's heating so comfortable, so clean, so convenient and so inexpensive it's making all other heating methods obsolete.

The thousands of users enjoying it are passing the good word around to their friends. The millions of readers of *Better Homes & Gardens, American Home,* and *House Beautiful* are learning about it from Bundy ads. They're sending in a landslide of coupons requesting literature. They're asking for the names of plumbing and heating contractors in their areas who handle Bundyweld Ceiling Radiant Heating.

Take this important step toward outdistancing your competitors—with the first really exciting heating development in years. Send coupon today for free literature.

Radiant Heating Division
BUNDY TUBING COMPANY
Detroit 14, Michigan

SEND FOR FREE LITERATURE!

LIKE HAVING
THE SUN
IN YOUR CEILING

Bundyweld
Ceiling Radiant Heating

Radiant Heating Division, Dept. HP-153
Bundy Tubing Company, Detroit 14, Mich.

☐ Send free 20-page nontechnical brochure explaining Bundyweld Ceiling Radiant Heating.
☐ Send Bundy technical radiant heating pamphlet.

Name____________________ Title__________
Company____________________________
Address____________________________
City____________________ Zone____ State________

For projects where nothing but the BEST is desired……
where nothing less than the BEST is acceptable….

PLAN FOR DUCT WORK
HEATING COOLING DUCT WORK

Grant Wilson
DUX-SULATION
(ASBESTOS PROTECTED)

Maximum, over-all efficiency in both thermal and accoustical insulation. Engineered exclusively for duct application.

"Costs more, and worth it!"

WRITE FOR
DUX-SULATION
SAMPLE KIT
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Grant Wilson inc.
ASBESTOS and INSULATING MATERIALS
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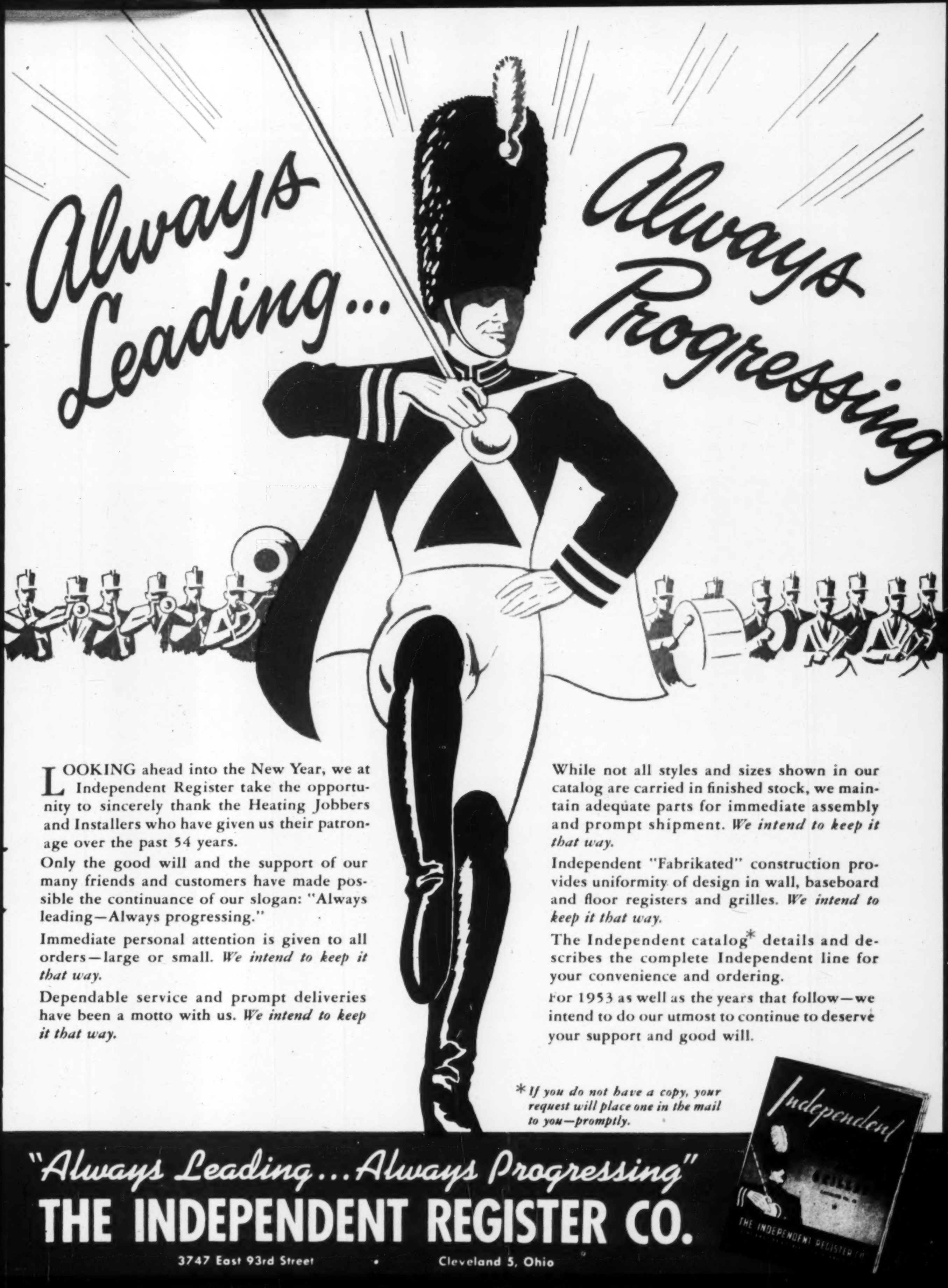


LOOKING ahead into the New Year, we at Independent Register take the opportunity to sincerely thank the Heating Jobbers and Installers who have given us their patronage over the past 54 years.

Only the good will and the support of our many friends and customers have made possible the continuance of our slogan: "Always leading—Always progressing."

Immediate personal attention is given to all orders—large or small. *We intend to keep it that way.*

Dependable service and prompt deliveries have been a motto with us. *We intend to keep it that way.*

While not all styles and sizes shown in our catalog are carried in finished stock, we maintain adequate parts for immediate assembly and prompt shipment. *We intend to keep it that way.*

Independent "Fabrikated" construction provides uniformity of design in wall, baseboard and floor registers and grilles. *We intend to keep it that way.*

The Independent catalog* details and describes the complete Independent line for your convenience and ordering.

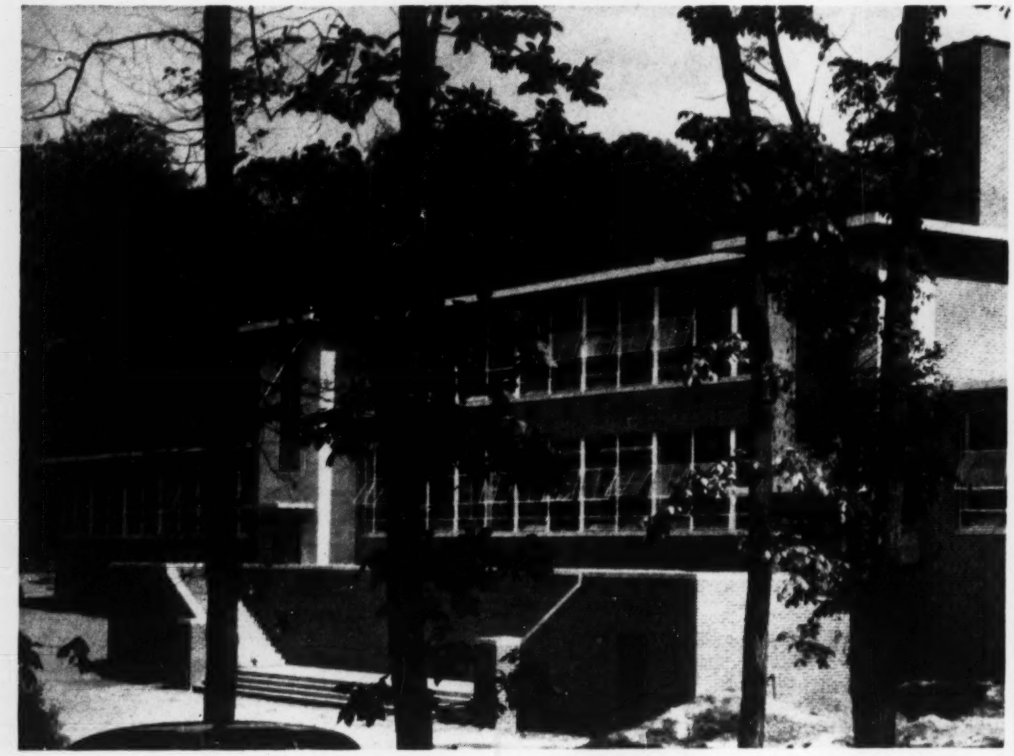
For 1953 as well as the years that follow—we intend to do our utmost to continue to deserve your support and good will.

** If you do not have a copy, your request will place one in the mail to you—promptly.*

"Always Leading ... Always Progressing"

THE INDEPENDENT REGISTER CO.

3747 East 93rd Street • Cleveland 5, Ohio



Architects and engineers, Warren, Knight and Davis, realized that large exposed glass areas, typical of school buildings, created a need for Honeywell Customized Temperature Control in the Charles B. Glenn Vocational High School. Other participating firms were: General Contractor, Richardson Construction Company; Mechanical Contractor, H. L. Eskew & Sons. All firms are located in Birmingham.

New high school demonstrates need for Honeywell Customized Temperature Control even in mild climate of the South

Birmingham's Charles B. Glenn

Vocational High School features individual room temperature control

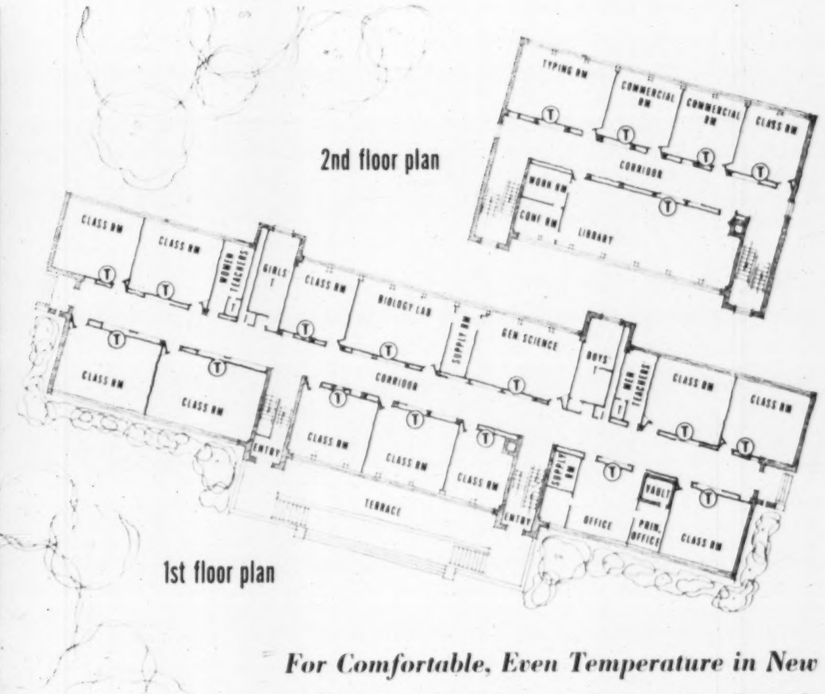
In developing the new school you see here, an enterprising architectural-engineering firm and an understanding school board are leading the way to greater comfort and more efficient learning for thousands of southern teen-agers.

And a Honeywell Customized Temperature Control installation is helping them provide these benefits for Birmingham students.

In the case of the Glenn School, the Honeywell installation is in the form of individual room temperature control—a thermostat in each classroom. The floor plan at right gives the location of the thermostats.

Today, in this school, teachers may keep temperatures right for most efficient learning—simply by adjusting a dial.

If the wind blows cold against the windows of their individual classroom they can easily adjust for the extra heat loss. And if during certain periods of the day the room is crowded, or the sun is hot, they can as easily *lower* the temperature.


2nd floor plan
TYPING RM
COMMERCIAL RM
COMMERCIAL RM
CLASS RM
CORRIDOR
WORK RM
CONF RM
LIBRARY
CLASS RM
CLASS RM
WOMEN TEACHERS
GIRLS T
CLASS RM
BIOLOGY LAB
SUPPLY RM
GEN SCIENCE
BOYS T
MEN TEACHERS
CLASS RM
CLASS RM
CORRIDOR
CLASS RM
CLASS RM
ENTRY
CLASS RM
CLASS RM
CLASS RM
TERRACE
ENTRY
SUPPLY RM
OFFICE
VAULT
PRIN. OFFICE
CLASS RM
T
1st floor plan

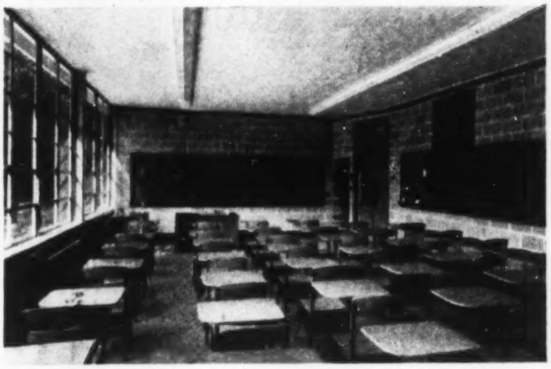
For Comfortable, Even Temperature in New or Existing Buildings – of any size – Specify Honeywell Customized Temperature Control

Whether it's a school, office, factory, hospital, apartment, store, garage—or any size building—new or existing, Honeywell Customized Temperature Control can help meet your clients' heating, ventilating, air conditioning and industrial control problems.

Once equipped with Honeywell Customized Temperature Control, they'll have an ideal indoor "climate"—and save fuel besides.

And with a complete line of pneumatic, electric and electronic controls to choose from, Honeywell Customized Temperature Control offers you the greatest flexibility in design. Then, too, when it comes to performance, Honeywell-built controls assure years of trouble-free operation. And they're backed by the finest service organization in the controls industry.

For full facts on Honeywell Customized Temperature Control, call your local Honeywell office. There are 104 across the nation. Or mail the coupon today.



In winter months, even in the South, classroom windows are a major source of heat loss. Chill winds reduce their temperature greatly—and this "draws" heat in large quantities. But with an adjustable Honeywell thermostat in each classroom such heat loss is easily compensated for. Above you see a typical modern classroom in the Charles B. Glenn school.

H. L. Eskew, heating contractor of Birmingham, says: "More and more in the South we're coming to realize the importance of proper temperature control and adequate heating methods. I think the Charles B. Glenn High School job is good evidence of that."

MINNEAPOLIS

Honeywell

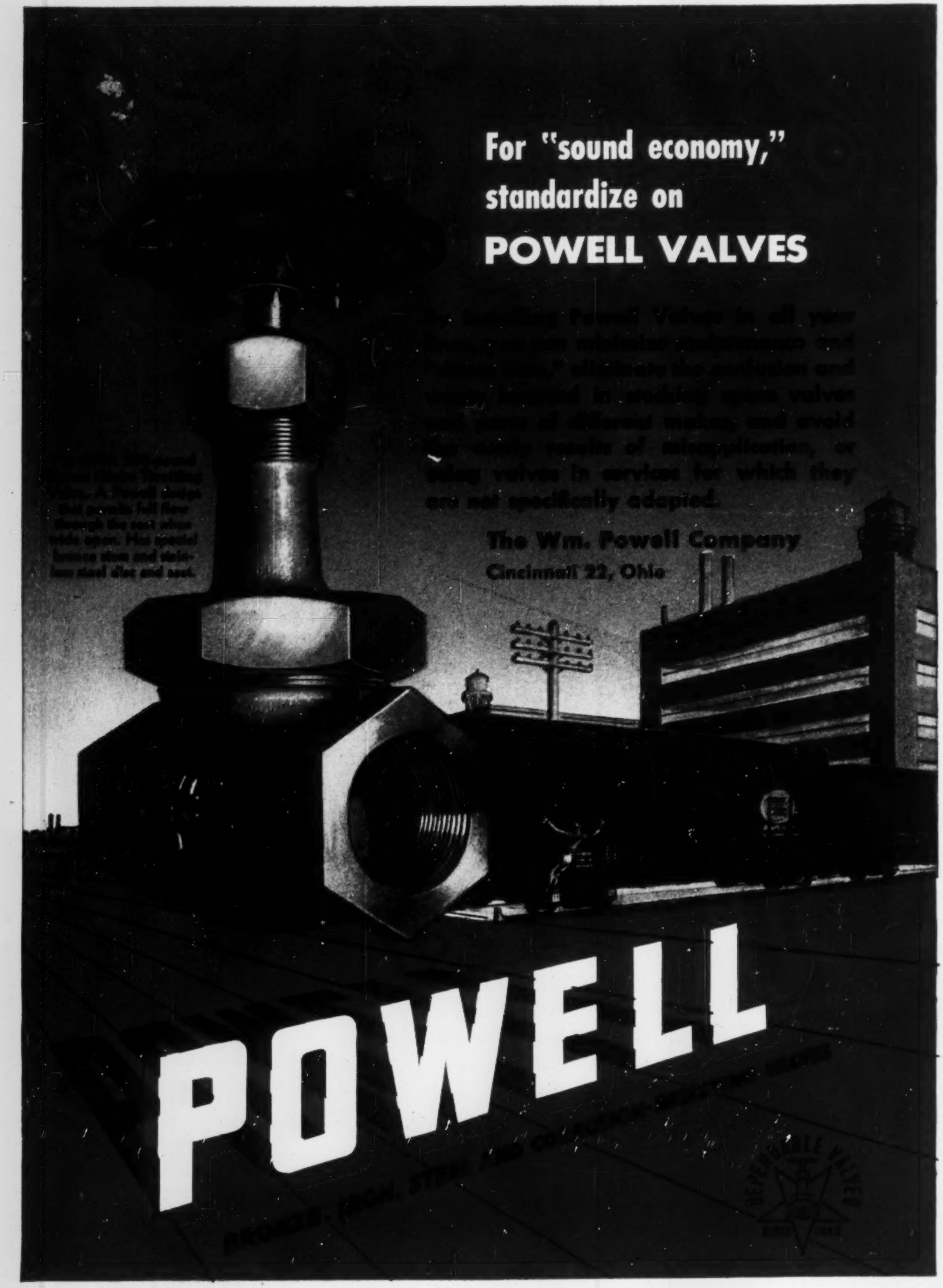
H
HONEYWELL

First in Controls

MINNEAPOLIS-HONEYWELL REGULATOR CO.
Dept. HA-1-14, Minneapolis 8, Minnesota

Gentlemen:
Please send me a free copy of the heating plans used for the Charles B. Glenn School, and more information about Honeywell Customized Temperature Control.

Name ....
Firm Name ....
Address ....
City .... *Zone* .... *State* ....

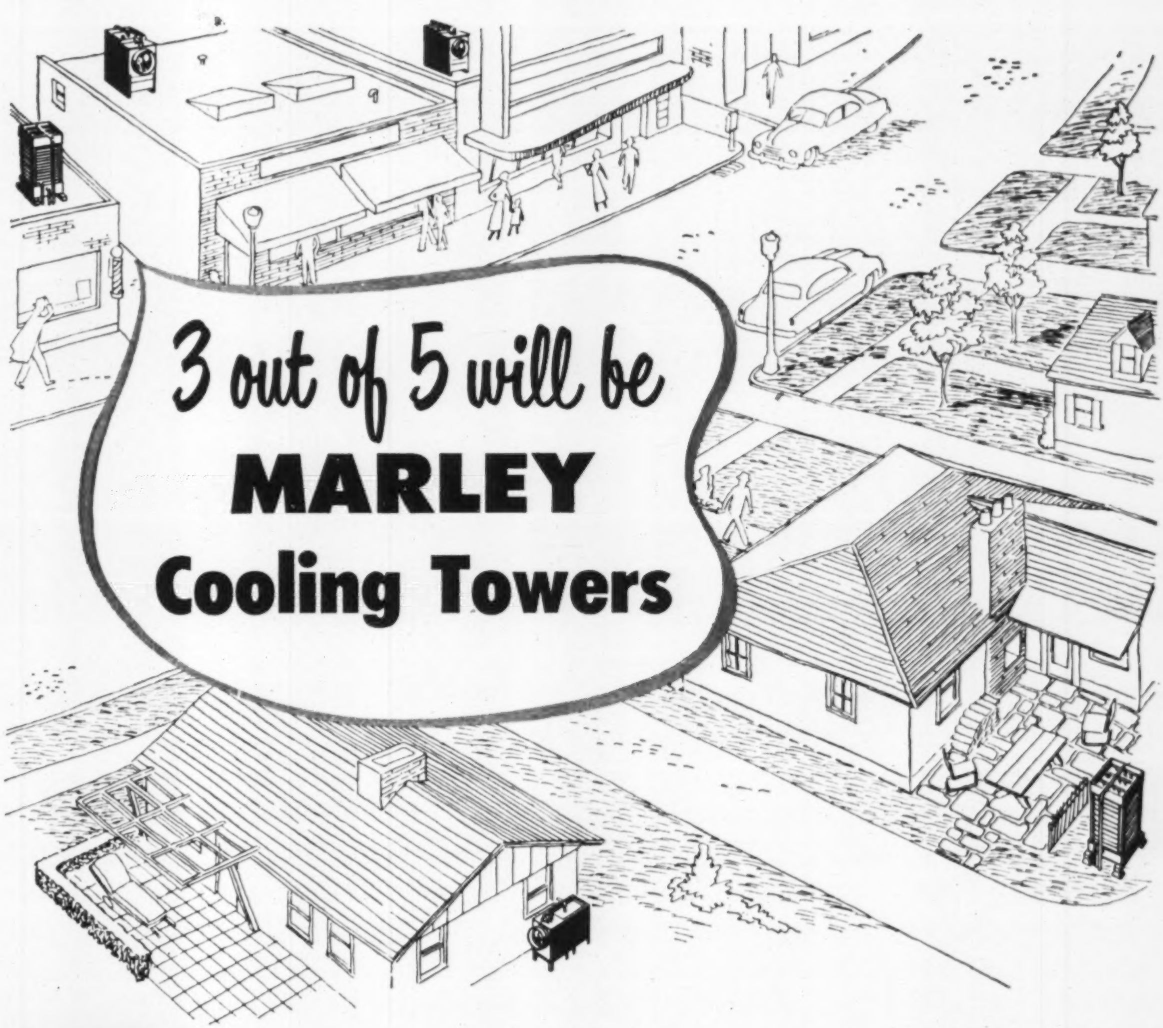


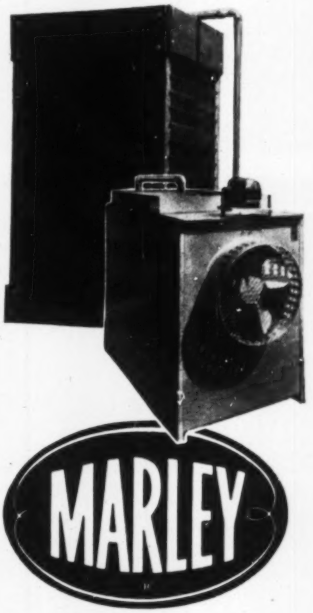
For "sound economy," standardize on POWELL VALVES

By installing Powell Valves in all your lines, you can minimize maintenance and "downtime," eliminate the confusion and waste involved in stocking spare valves and parts of different makes, and avoid the costly results of misapplication, or using valves in services for which they are not specifically adapted.

The Wm. Powell Company
Cincinnati 22, Ohio

[illegible] 300-pound [illegible] Globe Throttling Valve. A Powell design that permits full flow through the seat when wide open. Has special bronze stem and stainless steel disc and seat.





Every reliable estimate points to an unprecedented market in 1953 for air conditioning — and a corresponding demand for cooling towers. Past experience, combined with current Marley production to meet this demand, indicates that in many cities, 3 out of every 5 towers sold will be Marley cooling towers.

This overwhelming preference for Marley stems from the fact that Marley towers are accepted as the standard of the air conditioning industry. This acceptance is a result of 25 years of Marley leadership and specialization in water cooling research and engineering . . . of the unique completeness of the Marley line . . . of ready availability from stocks in many cities . . . of guaranteed performance.

Even now, Marley is producing thousands of Aquatowers and natural draft towers to build up stocks in 30 cities. In making plans to capture your share of the market this year, you can count on an adequate supply and "over-the-counter" delivery of Marley towers, the cooling towers with built-in acceptance.

Visit our booth, No. 1043, at the A. S. H. & V. E. Show

MARLEY

The Marley Company

Kansas City 5, Missouri

You can put full confidence in them!

THESE *McQuay* REPRESENTATIVES

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veland, Ohio
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H. CREEARS
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No. 1 in a series of 3 advertisements

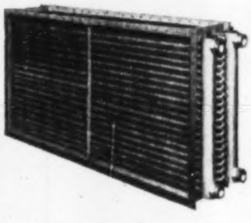
McQuay INC.

HEATING
REFRIGERATION
AIR CONDITIONING

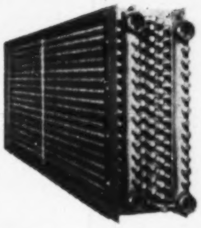
MAKE THE SEASONS COME TO YOU

1601 Broadway St. N. E., Minneapolis 13, Minnesota

THIS COMPLETE LINE OF FAMOUS McQuay PRODUCTS

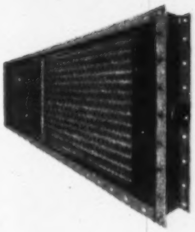


WATER COIL

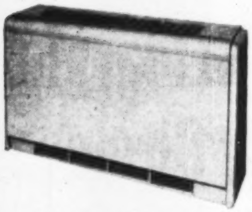


CLEANABLE TUBE WATER COIL

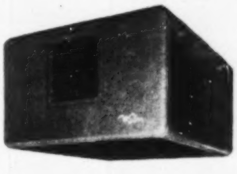
DIRECT EXPANSION COIL



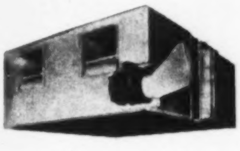
"BLAST" HEATING STEAM COIL



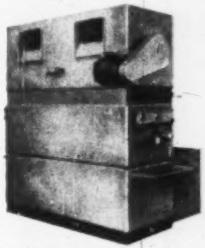
SEASONMAKER (FLOOR)



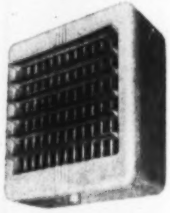
"RH" AIR CONDITIONER



AIR CONDITIONER
(Suspended Model)

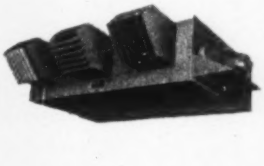


AIR CONDITIONER
(Floor Model)

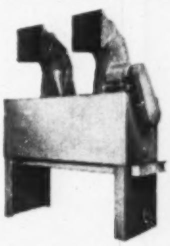


HORIZONTAL UNIT HEATER

DOWN FLOW UNIT HEATER

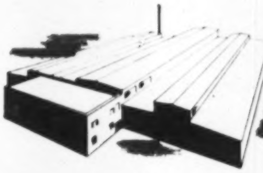


BLOWER TYPE UNIT HEATER
(Suspended Model)

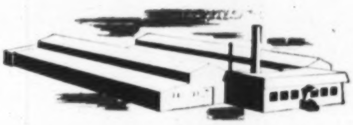


BLOWER TYPE UNIT HEATER
(Floor Model)

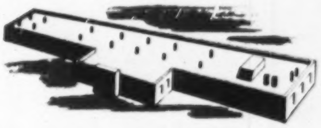
▼ McQuay representatives, in all principal cities throughout the United States, are qualified by long experience and training to help you satisfy all of your air conditioning and heating requirements. For cooperation in making the sale, technical advice, or getting the job done on time, consult the McQuay representative in your territory. Available to you through him is the complete line of McQuay products, featuring famous Ripple-Fin construction—a McQuay exclusive, assuring maximum heat transfer efficiency and dependable performance.



PLANT 1—1600 Broadway N. E.
MINNEAPOLIS 13, MINN.

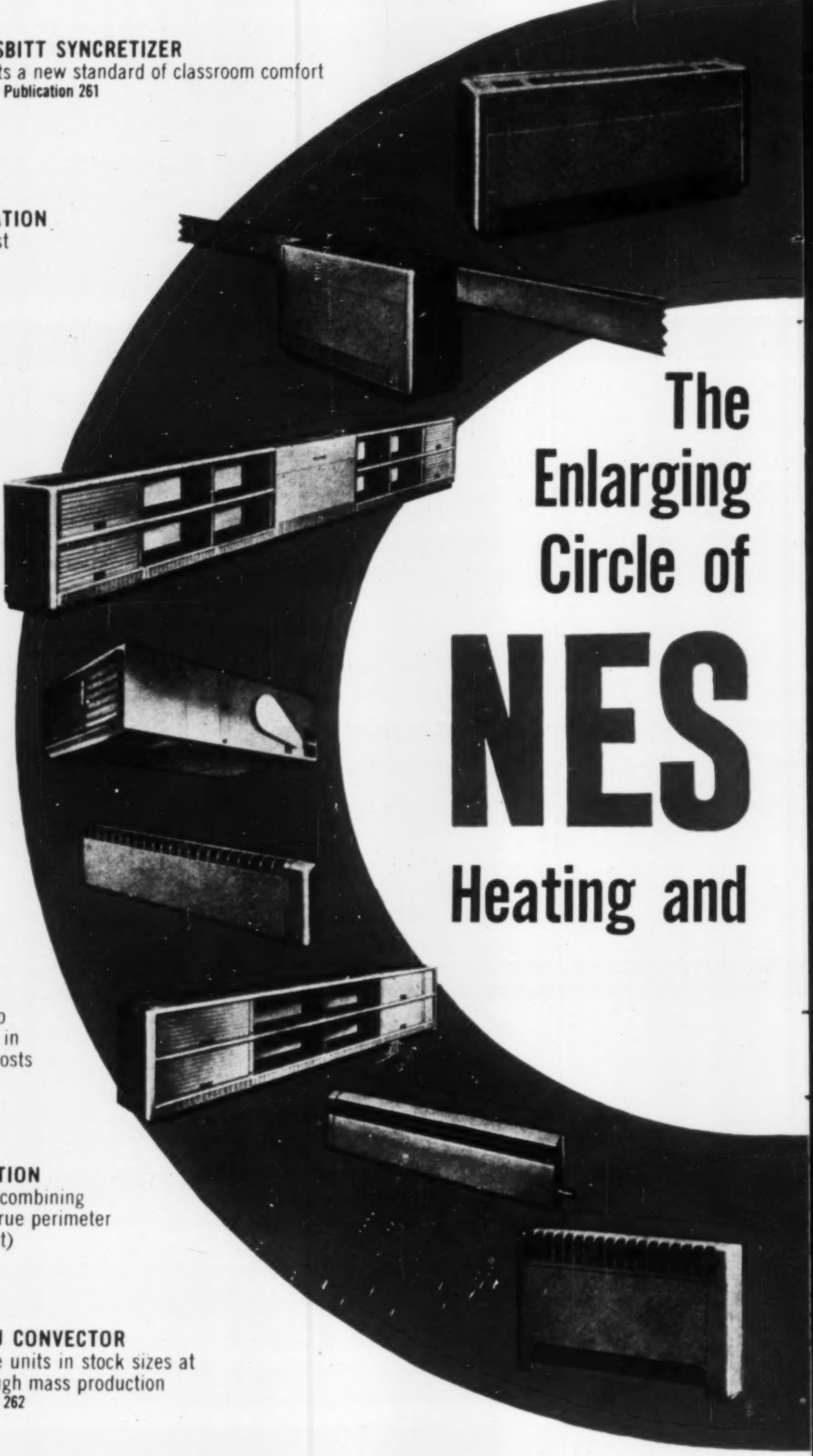


PLANT 2—1729 Broadway N. E.
MINNEAPOLIS 13, MINN.



PLANT 3—4th and Park Ave.
FARIBAULT, MINN.

The Enlarging Circle of NES
Heating and



THE NESBITT SYNCRETIZER
The unit ventilator that sets a new standard of classroom comfort
Publication 261

SYNCRETIZER AND WIND-O-LINE RADIATION
The system of positive protection against window downdrafts
Publication 265 and 261 Sec. W

THE NESBITT PACKAGE
Nesbitt Syncretizer, Storage Units and Wind-o-line Radiation integrated for classroom comfort, beauty and utility
New Publication 261 Sec. G

THE NESBITT THERMOVENT
Now available with acoustically treated discharge section for quieter operation in capacities up to 15,000 CFM
New Publication 270

NESBITT SILL-LINE RADIATION
In the first enclosure design that harmonizes with modern interiors while preserving all the advantages of perimeter strip heating
Publication 271

STORAGE UNITS WITH SILL-LINE
Combining the advantages of perimeter strip heating with the utility of metal storage units in an engineered package at low mass-production costs
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NESBITT BASEBOARD RADIATION
A new approach in baseboard design combining unusual beauty and ample capacity for true perimeter heating (4 sq. ft. EDR per foot)
New Publication 272

NESBITT MODEL U CONVECTOR
Custom quality universal-type units in stock sizes at low prices achieved through mass production
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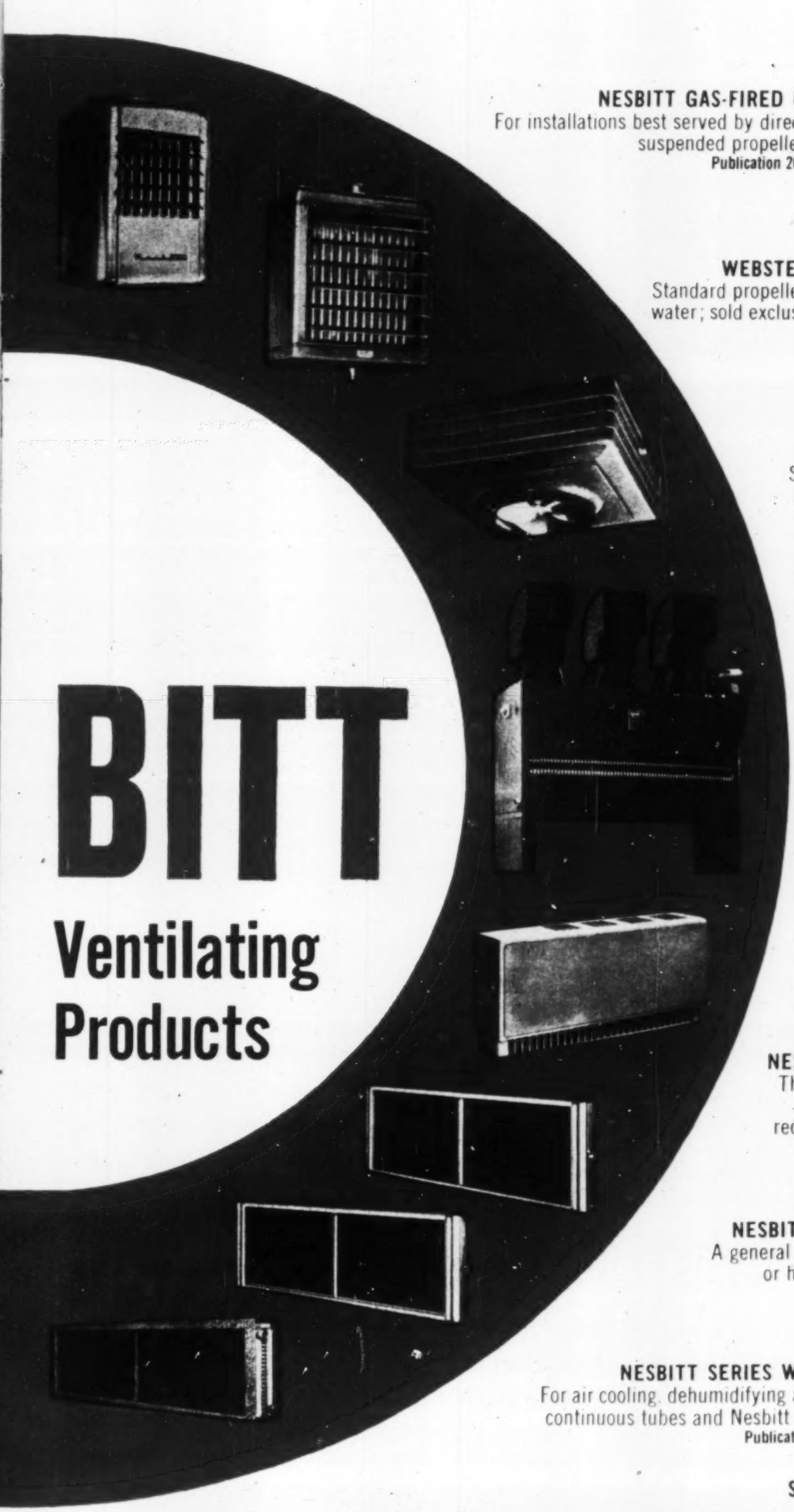


BITT Ventilating Products

NESBITT GAS-FIRED UNIT HEATER
For installations best served by direct-fired space heaters of the suspended propeller fan type
Publication 266

WEBSTER-NESBITT UNIT HEATER
Standard propeller fan heaters for steam or forced hot water; sold exclusively by Warren Webster & Company
Publication WN126

WEBSTER-NESBITT LITTLE GIANT
Standard propeller fan unit heaters with blower fan performance characteristics
Publication WN134

WEBSTER-NESBITT GIANT
Standard blower type unit heaters of large capacity and variable features for industrial heating and ventilating
Publication WN128

WEBSTER-NESBITT SERIES R
Standard cabinet unit heaters of classic design for commercial and industrial uses
Publication WN133

NESBITT SERIES D HEATING SURFACE
The surface with steam-distributing tubes pioneered by Nesbitt for installations requiring uniform temperature distribution
Publication 247

NESBITT SERIES H HEATING SURFACE
A general purpose heat transfer surface for low- or high-pressure steam applications
Publication 248

NESBITT SERIES W WATER SURFACE
For air cooling, dehumidifying and heating; with cleanable or continuous tubes and Nesbitt exclusive drainability feature
Publication 246

Send for publications on the items that interest you

MANUFACTURED BY JOHN J. NESBITT, INC., PHILADELPHIA 36, PENNSYLVANIA

COLD MEETS ITS WATERLOO

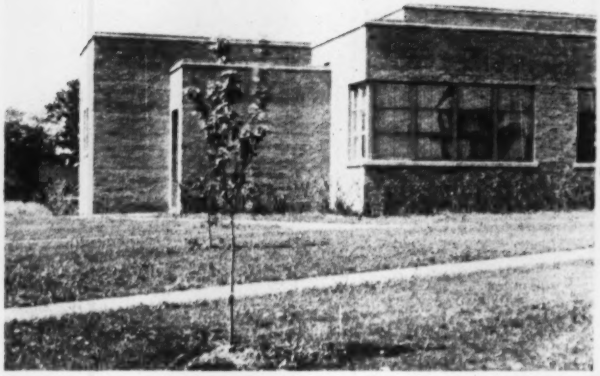
In Waterloo, New York, with

Webster

WALVECTOR

REG. U. S. PAT. OFF.

For Steam or Hot Water Heating



New York Community modernizes its school system with new schools and Tru-Perimeter Heating.

When Waterloo, N. Y., decided its educational shoe was pinching they called on Carl C. Ade, prominent Rochester architect and engineer, to help remedy the situation.

Result — the handsome new Lafayette Elementary School illustrated here and the even larger Skoi-Yase (Indian for 'bubbling water') Elementary School now under construction. With these new schools, and its existing buildings, Waterloo has solved its educational space problems for many years to come.

For efficient, modern heating, both these new schools use Webster Walvector, as do many of the schools designed by Carl C. Ade's office.

Here is Tru-Perimeter Heating. The cold perimeter walls of the buildings are heated gently and evenly. There are no cold spots, no hot spots, no drafts. With Webster Walvector, the heating element and piping are concealed in attractive metal enclosures.

Webster Walvector in perimeter heating simplifies piping, uses fewer risers. Heating up is quick, effectively controlled. Buildings can be heated just before occupancy and the heat reduced immediately after the need is gone.

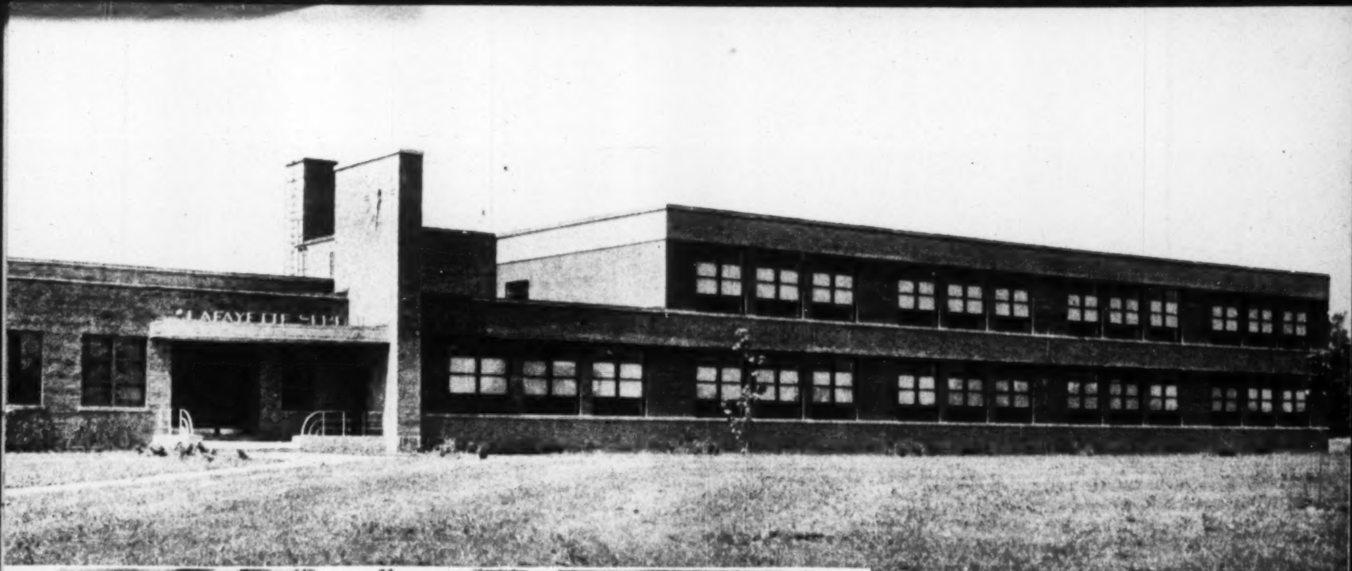
Whether you are contemplating new construction or modernization, look into the advantages of Webster Walvector. For complete information call the Webster Representative or write us.

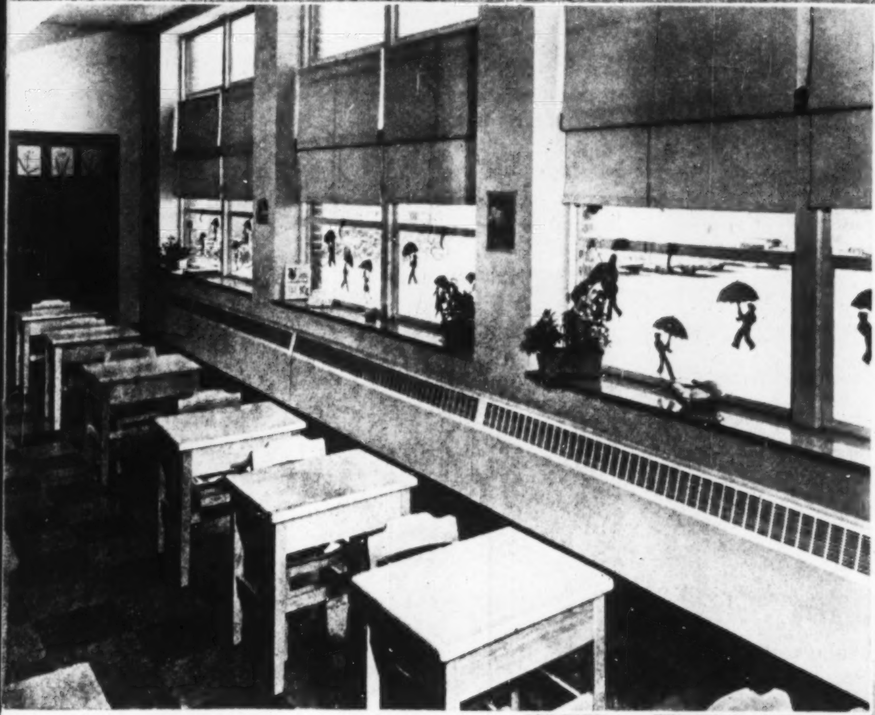
Address Dept. HP-1

WARREN WEBSTER & COMPANY

Camden 5, New Jersey : : Representatives in Principal Cities

In Canada, Darling Brothers, Limited, Montreal





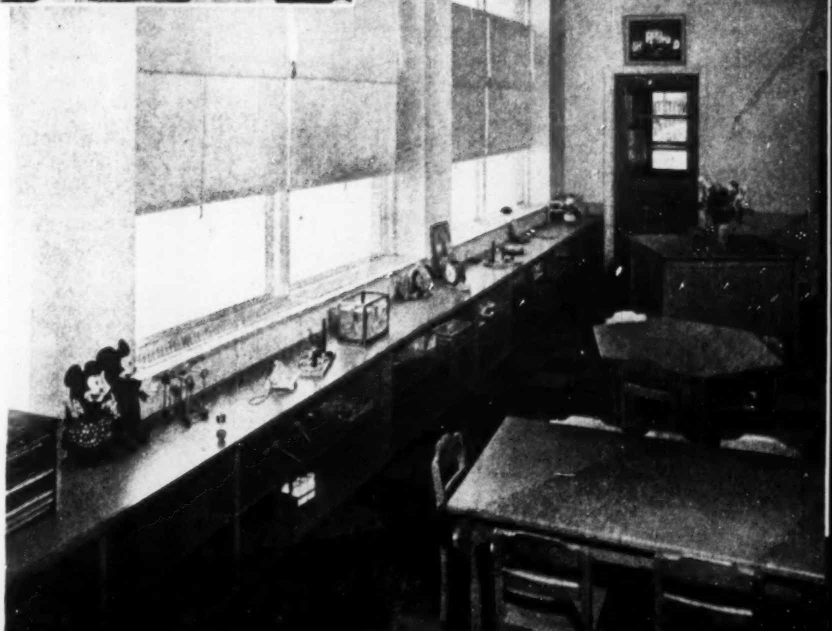
Recent Schools by Carl C. Ade that use Webster Walvector

Elementary School, Fulton, N. Y.
Britton Road School, Greece, N. Y.
Irondequoit Jr.-Sr. High School
District #3, Irondequoit, N. Y.
Pittsford Jr.-Sr. High School
Pittsford, N. Y.
Griffith Institute, Springville, N. Y.
Bryant School, Hornell, N. Y.
Lafayette School, Waterloo, N. Y.
Skoi-Yase School and Bus Garage
Waterloo, N. Y.
Webster Central School, Webster, N. Y.
West Webster Elementary School
West Webster, N. Y.

Top: Lafayette Elementary School, Waterloo, New York. Completed in 1951 at a cost of $550,000. Includes a kindergarten, cafeteria, auditorium and gymnasium and 15 classrooms. Architect and Engineer: Carl C. Ade. Heating Contractor: A. Burgart, Inc.

Above: Webster Walvector under windows in Lafayette School classroom. Air enters below Walvector enclosure, is gently warmed by heating element and passes out through the attractive grilles. Wall-to-wall warmth, no cold spots.

Right: Kindergarten of the Lafayette School. Here concealed Webster System Radiators deliver heat through top outlet grilles shown in window sills. Air enters below toy shelving.



1853

"This sectional boiler principle means the birth of central heating!"

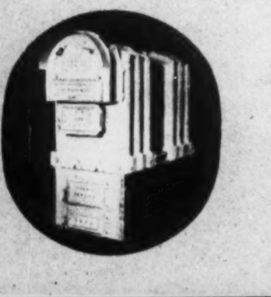
Boats still lay in the old canal basin at Westfield, but the canal warehouse had become a foundry in 1853. It was then that Henry B. Smith, a successful merchant, editor and printer, and his brother, Edwin, a banker, acquired the property and established H. B. Smith & Company. By 1859 the Company had built a reputation for fine cored castings.

At this time John R. Reed, 27, began a long and successful career with the Company.

The parlor stove was replacing the fireplace, but the Smith brothers and Reed foresaw the day when steam, generated in a central boiler, could be piped to radiators in all rooms. They were ready in 1859 when Samuel Gold, inventor of a cast iron sectional boiler, negotiated with the Company for its manufacture. Purchasing Gold's patents, the Company became the first to manufacture and market cast iron sectional boilers. Fostered by engineering ingenuity and manufacturing skill, the Gold patent boiler has been developed into the world's broadest line of cast iron boilers for heating.

BIRTH OF AN INDUSTRY . . . AND AN ERA

Far ahead of its time was the original Gold Patent Boiler, pioneer of wet heating . . . first commercially practical cast iron sectional boiler.



Easiest to Install!

Because H. B. Smith cast iron boilers are assembled from precision-machined sections and parts, they are easily erected at the installation with a minimum of labor. Can be erected on location at any stage in building.

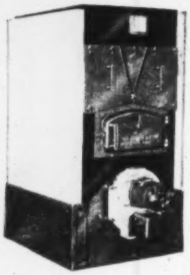
Easiest to Convert!

H. B. Smith boilers are easiest to convert to different fuels, should the one in use become in critical supply. All operate with great efficiency with solid fuel, oil or gas. In low-cost natural gas areas, H. B. Smith boiler conversions are bringing clean, trouble-free, inexpensive heat to hundreds of users.

Easiest to Expand!

When increasing the capacity of an H. B. Smith boiler to meet additional heating requirements, or when replacing it, it is not necessary to tear out a wall, part of a foundation, or both. In Header-type Series 24 – 34 – 44 and 42 and 60 Boilers, a damaged section can be cut out of the line without delay or extensive repairs.

1953 World's Broadest Line



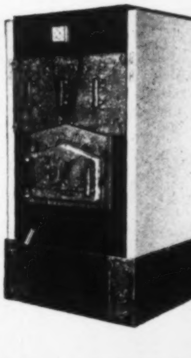
Series 100 and 2000 Smith-Mills Boiler-Burner Units for Homes and Smaller Commercial Installations.

Compact, easy to install! Designed to give fast heat and plenty of hot water for the average home. Furnished with built-in tank type or "tankless" water heater; available with flush jacket as shown, or with jacket expanded to conceal the oil burner.

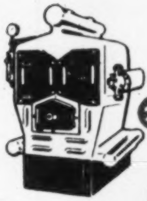
Series 15, 20, 25 Smith-Mills Boilers for Homes and Smaller Commercial Installations.

Here's a complete series of modern push nipple boilers available in models for oil, gas, coal stoker or hand firing, with provision for built-in domestic water heaters and controls. Capacities of 200 sq. ft. to 2275 sq. ft. steam radiation.

Line includes the RELIANCE Boilers, Series 20 EG and 25 EG, embodying combustion chamber at rear for oil-burner installation, and complete fire box with grates for coal and wood firing in case of power shut-off.



A CENTURY IN '53 -- OUR YEAR OF GREATEST PROGRESS



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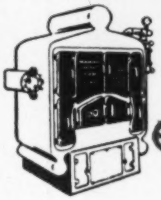

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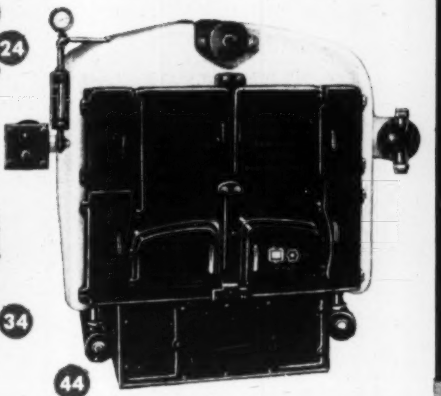

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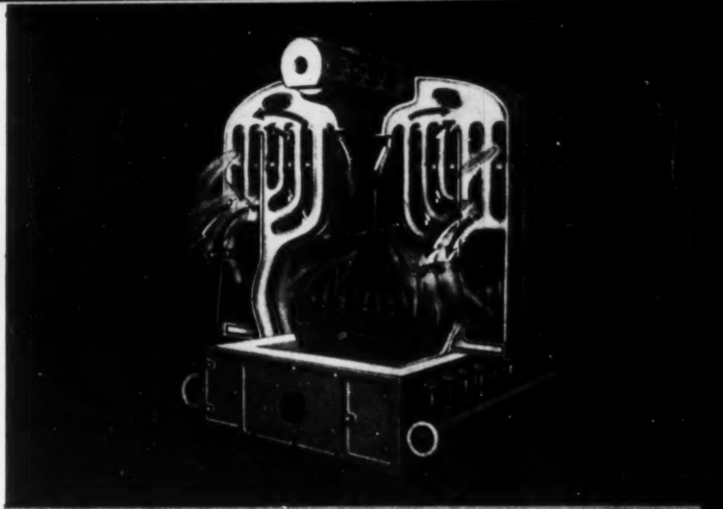


Series 24, 34, 44 Mills Boilers for Schools, Apartments, Public Buildings

Capacities of 900 sq. ft. to 13,380 sq. ft. steam radiation. Independent header-type construction; there are tens of thousands of famous Mills boilers in schools, hospitals, apartment houses, stores and other commercial and public buildings. Models for hand and all types of automatic firing.

MORE HEATING SURFACE LONGER FLUE TRAVEL

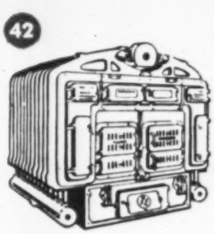
Notice how the hot flue gases really get around the vertical cast iron water tubes: to top of boiler, across to each side, then to front through upper side flue channels, then down and back through the lower channels to the smoke outlet. Tall chimneys or induced draft systems are not necessary — distinct advantages in modern one-story buildings.

·of Cast Iron Boilers for Heating and Domestic Hot Water

Series 42 and 60 Smith Boilers for Large Installations

May be used singly, or in batteries for heating loads up to and over 100,000 sq. ft. steam radiation. Many of these large units installed in industrial plants furnish steam for process requirements as well as for heating and domestic hot water. Have header-type construction permitting the cutting off of one or more sections in emergency without serious shut-down.

42



60

17

Hy-Tests for Domestic Hot Water

Series 17, 24, 34 and 44, oil or hand-fired hot water supply units are most often used in connection with the larger types of heating installations, such as apartment houses, factories, public buildings, etc. They are all readily convertible from one fuel to another and work equally well with oil, coal or gas.

The 24, 34 and 44 Hy-Test boilers are all "Mills type" units with the famous Mills vertical water tubes and header type construction.

Coming!....a new GAS-FIRED BOILER

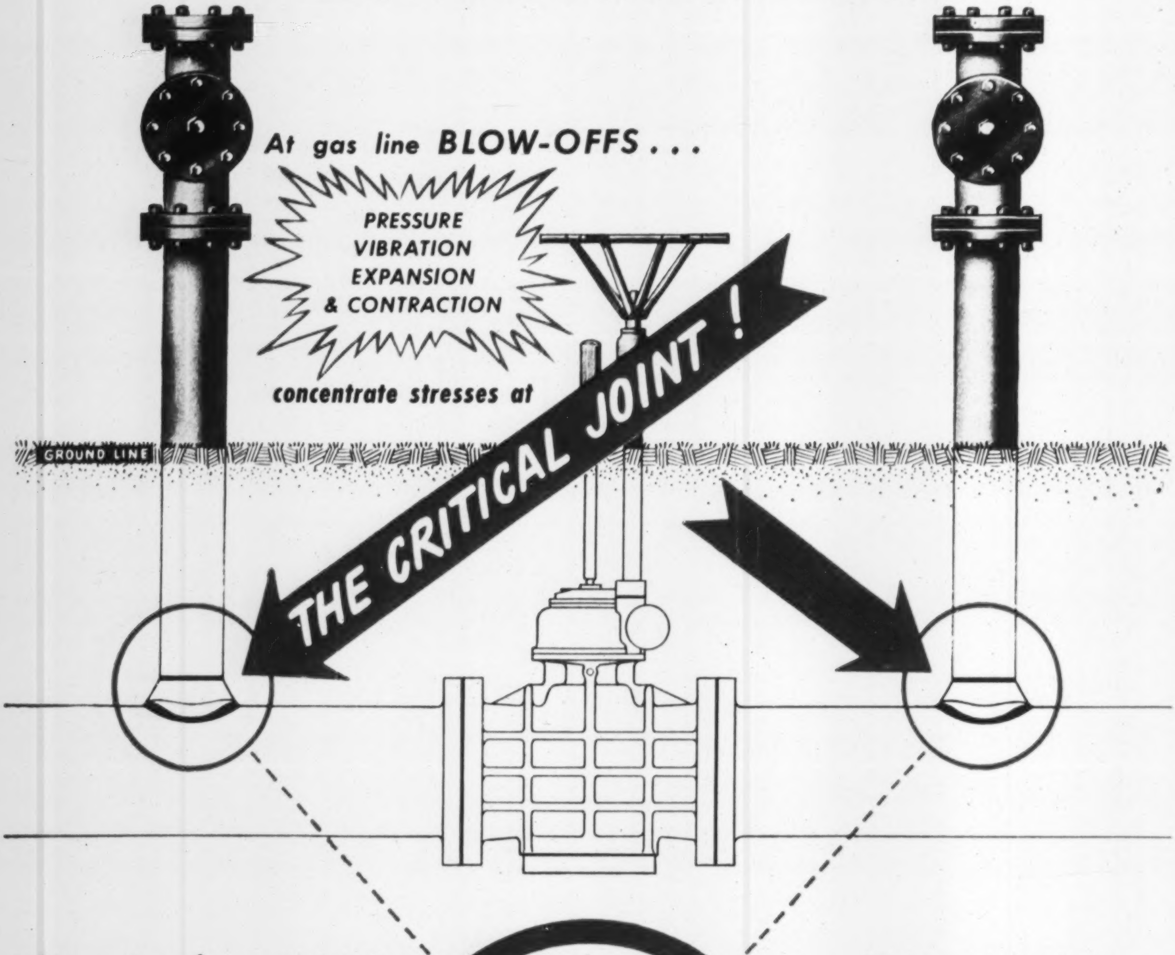
designed from the ground UP by H. B. Smith. It incorporates all of the best engineering in gas-fired boiler design and construction.

H. B. *Smith* CAST IRON BOILERS

THE H. B. SMITH CO., INC., WESTFIELD, MASS., ESTABLISHED 1853

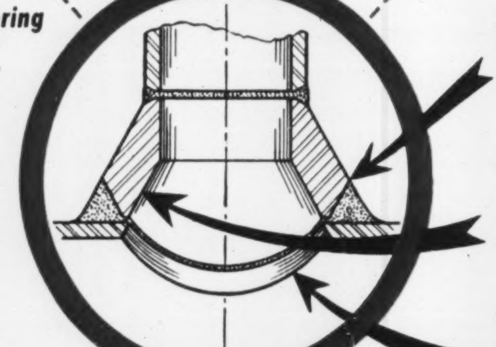
ENGINEERED REINFORCEMENT

FOR YOUR BRANCH CONNECTIONS


At gas line BLOW-OFFS . . .
PRESSURE
VIBRATION
EXPANSION
& CONTRACTION
concentrate stresses at
THE CRITICAL JOINT !
GROUND LINE

A big portion of your engineering job is done for you, if you...

Specify
BONNEY WELDOLET
Welding Fittings
to insure
permanent strength



Reinforcement where both the mechanical and internal stresses are most severe

Funneled to relieve mechanical stress concentrations and improve fluid flow

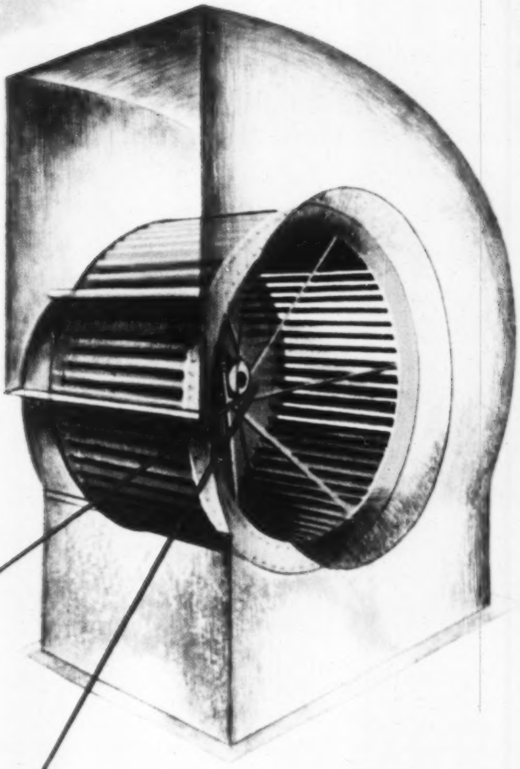
Shaped and beveled for clean, quick and economical installations

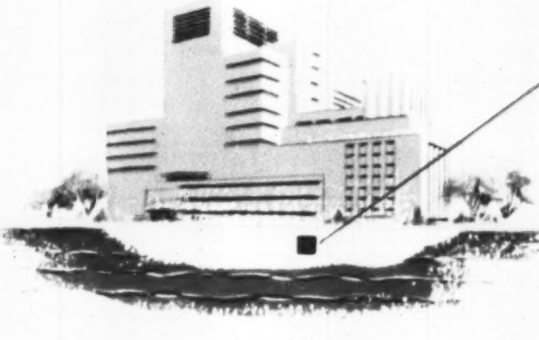
FOR COMPLETE ENGINEERING DATA WRITE FOR YOUR BONNEY W3 WELDOLET CATALOG

DISTRIBUTORS IN PRINCIPAL CITIES

WELDING FITTINGS DIVISION
BONNEY FORGE & TOOL WORKS
ENG. DEPT., 715 MEADOW STREET
ALLENTOWN, PENNSYLVANIA

American Blower – a time-honored name in air handling





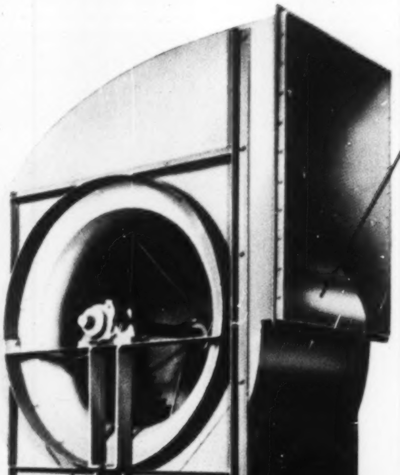
Since 1908, thousands upon thousands of Sirocco Fans have been installed throughout the world—in mechanical draft and industrial applications, in heating, drying, ventilating, air conditioning, fume removal and processing systems.

This unparalleled record in the field is due in part to these facts: The Sirocco Fan operates at lower speed, delivers more air per revolution than any other type fan, and, for a given duty, the Sirocco Fan occupies the minimum amount of space.

For data on how the Sirocco Fan can best be applied to your business, consult the nearest American Blower Branch Office.

AMERICAN BLOWER CORPORATION, DETROIT 32, MICHIGAN
CANADIAN SIROCCO COMPANY, LTD., WINDSOR, ONTARIO

Division of American Radiator & Standard Sanitary corporation

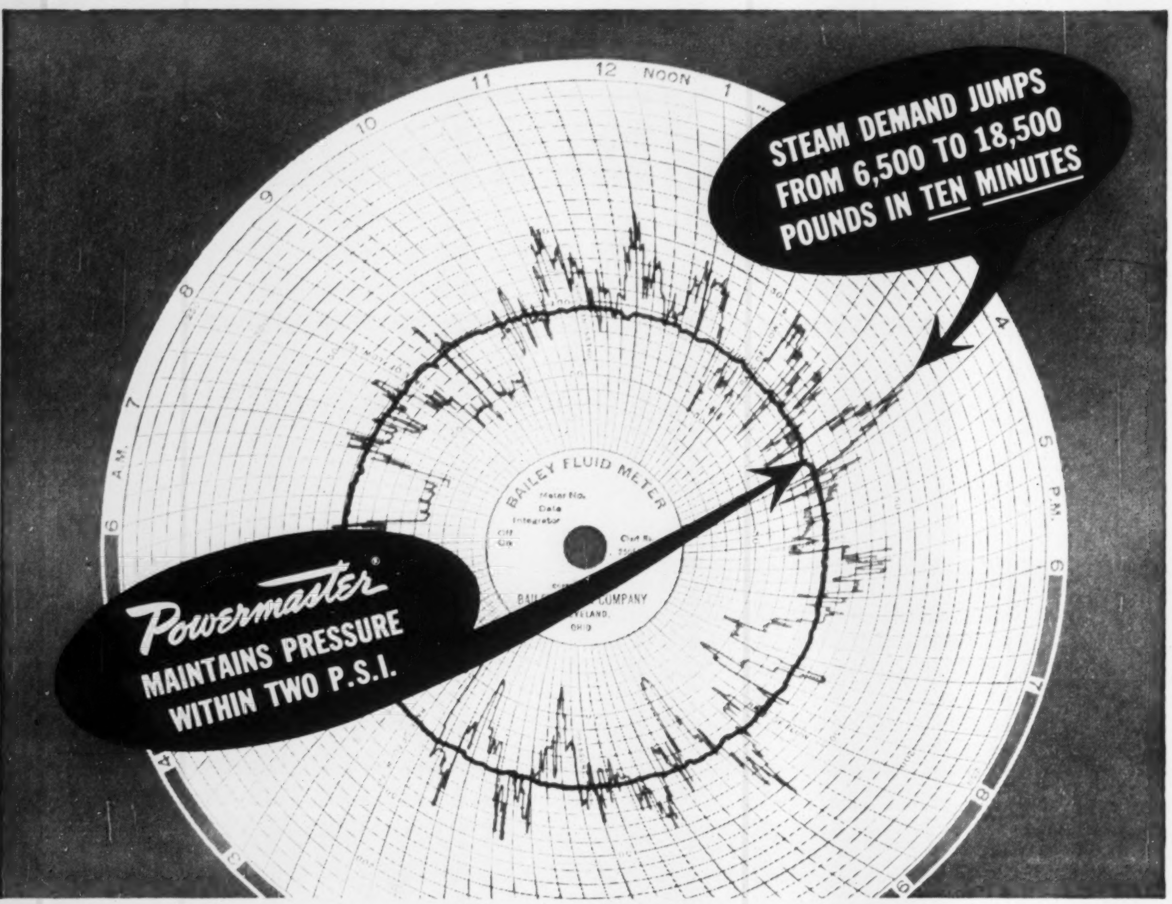


American Blower Series 81 Sirocco Fan. All Sirocco Fan ratings are Certified in accordance with the Standard Test Code as adopted jointly by the NAFM and ASH&VE.

AMERICAN BLOWER
YOUR BEST BUY IN AIR HANDLING EQUIPMENT

Serving home and industry

AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS HEATER



Performance records prove *Powermaster's* VORIFLOW combustion responds immediately to steam demand . . . and at full efficiency

At a large southern cotton mill, two 300 h.p. POWERMASTER boilers are generating steam 'round-the-clock at a constant pressure of 100 p.s.i. Note how evenly this pressure (blue line on chart) was maintained even though steam demand (red line) varied from a low of 3,000 pounds per hour to a high of more than 18,500. Between 3:30 P.M. and 3:40 P.M. the load nearly tripled . . . but the POWERMASTERS responded immediately with insignificant pressure change and no "hunting".

This kind of performance is possible because of POWERMASTER's exclusive VORIFLOW combustion. Here's what it will do for you:

1. Saves fuel by providing infinitely variable combustion modulation in response to demand—with *full efficiency*—through wide range from 30% to 100% of firing capacity.

This means elimination of waste and maintenance headaches because of incomplete combustion. The VORIFLOW air-atomizing oil burner does away with outmoded mechanical spinning devices, globules of wasted oil, and gummy cleaning problems. The VORIFLOW gas burner is an O&S pre-mix design equally efficient at all firing rates between 30% and 100% loads.

2. Slashes boiler maintenance costs.

The burner has *no* moving parts to wear out • There is *no* cup to clean daily • Routine cleaning of the burner once a month is sufficient • There is *no* burner vibration to throw adjustments "out of whack" • Parts are made of stainless steel, brass, and beryllium copper—they will last indefinitely.

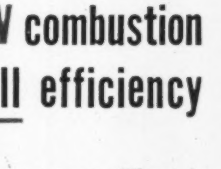
3. The combination burner permits rapid change-over from one fuel to another—light oil, heavy oil, or gas.

Before deciding on a boiler for your plant, be sure to get the facts on the newest POWERMASTER with VORIFLOW combustion. Write for this catalog that gives you the entire story of the *Powermaster* packaged automatic boiler. Just drop us a line and we'll put one in the mail for you.

Powermaster®

PACKAGED AUTOMATIC BOILERS

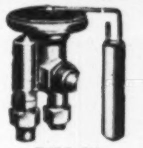
In sizes to 500 HP; pressures to 250 psi.



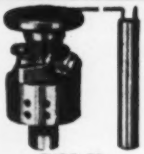
ORR & SEMBOWER, INC. • Established 1885 • **990 Morgantown Road, Reading, Pennsylvania**

THERMO EXPANSION VALVES

TYPE 402
with pressure
limiting feature


TYPE TK
"3 valves in 1"

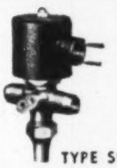
TYPE TCL

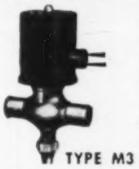

TYPE TR
Multi-Outlet

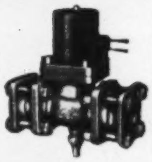
For automatic control of liquid refrigerant on all types of refrigeration and air conditioning systems. Capacities from fractional tonnage to 50 tons "Freon-12", 100 tons Methyl Chloride. Low temperature valves for −40° F. to −100° F.

SOLENOID VALVES

TYPE S1


TYPE S2


TYPE M3


TYPE R2

For all types or service. For liquid: "Freon"—up to 75 tons. Methyl Chloride—up to 150 tons. For suction: "Freon"—up to 8.8 tons. Methyl Chloride—up to 17 tons. For brine, water, gas, air and steam.

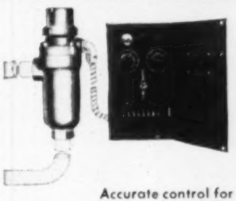
FLOAT VALVES AND SWITCHES

TYPE HK
high pressure
float valve

Up to 5 tons "Freon-12", 10 tons Methyl Chloride and 20 tons Ammonia.

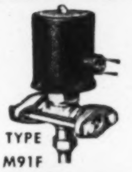
TYPE J5
electric
float
switch

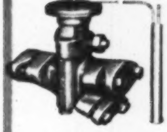
For "Freon", Methyl Chloride, Ammonia and other non-corrosive liquids having a specific gravity of .6 or more Up to 460 volts AC and 250 volts DC.

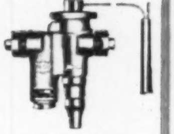

908
LECTRO-LEVEL
electronic
remote
control of
liquid
level

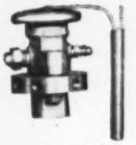
Accurate control for full-flooded evaporators. Adjustable to a wide range of level changes. Easy-to-set control dials conveniently mounted in remote box. Successfully used for over 5 years.

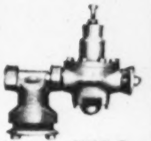
AMMONIA CONTROLS


TYPE
M91F


TYPE TG

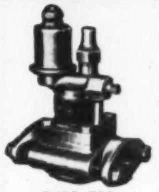

TYPE UG


TYPE TX

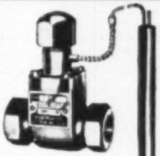

TYPE E
with Strainer

Solenoid Liquid Valves — up to 172 tons. Solenoid Suction Valves — up to 28 tons. Thermo Expansion Valves—from fractional tonnage to 125 tons. Automatic Expansion Valves — from fractional tonnage to 60 tons.

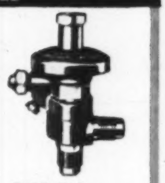
SUCTION LINE CONTROLS


TYPE EPR

For all refrigerants with connection sizes up to 6"


TYPE 732
SNAP-ACTION
SUCTION VALVE

Temperature operated —½ ton, "Freon-12"— 1 ton, Methyl Chloride.


TYPE 760
"EVAPOTROL"

Pressure regulator—½ ton, "Freon-12" — ¾ ton, Methyl Chloride.

ALCO VALVES

the COMPLETE LINE of refrigerant controls

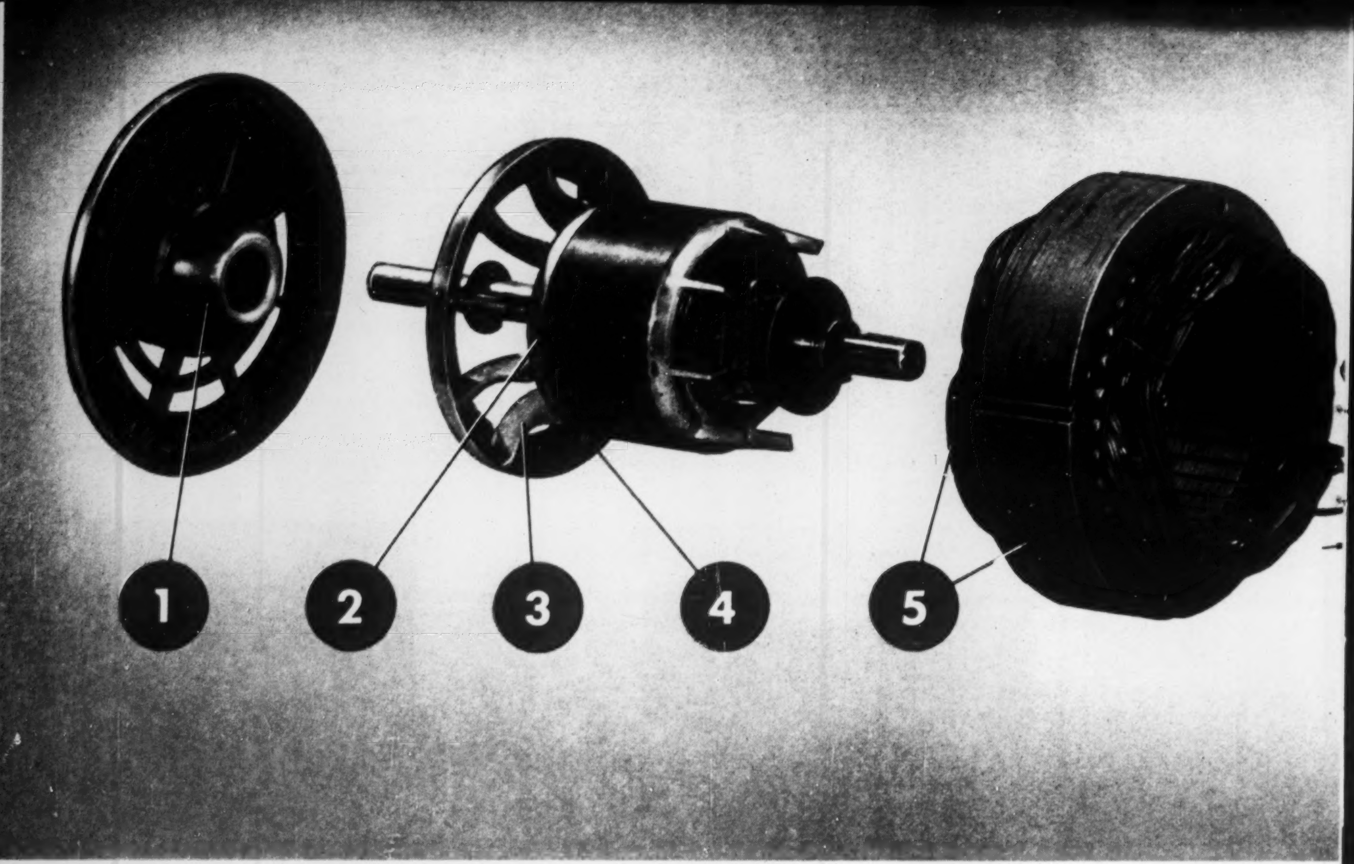
For capacities in excess of those listed, write us for further details and give specific requirements.

ALCO ALSO MAKES: Constant Pressure Expansion Valves — Liquid and Suction Line Strainers.

AVAILABLE AT YOUR WHOLESALER'S

ALCO VALVE CO.

861 KINGSLAND AVE. • ST. LOUIS 5, MO.



1. VERSATILE!—All-angle bearing and lubrication system permits motor to operate in any position.

2. SMOOTH RUNNING!—Precise rotor balancing and concentricity of rabbets and bearings.

3. EFFICIENT!—New electrical design, ventilation give top performance in least space.

4. QUIET!—Advanced magnetic design and unitized rotor-fan casting provide quiet operation.

5. LONG-LIFE!—*ALL* synthetic insulation resists moisture, corrosion and electrical breakdown.

Ten good reasons for using

Above you see ten good, basic reasons for using the all-new G-E "form G" motor—right now! And at your right are four big "plus" reasons perhaps even more important to you.

Completely different . . . completely *functional* . . . this general-purpose motor gives you full NEMA performance plus up to *50% less weight, 40% less bulk—rating for rating!*

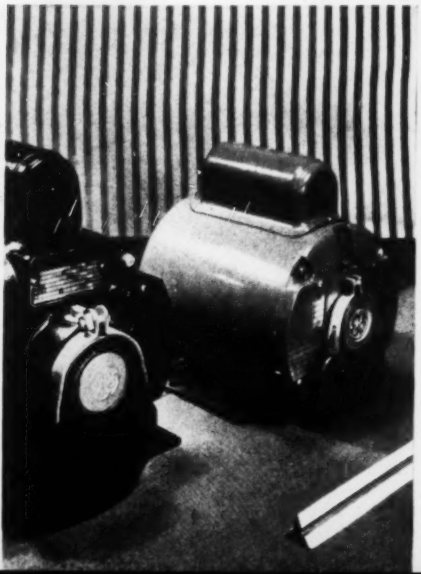
You get efficiency, sturdiness, extra long life . . . *plus quiet, all-angle operation in every rating!*

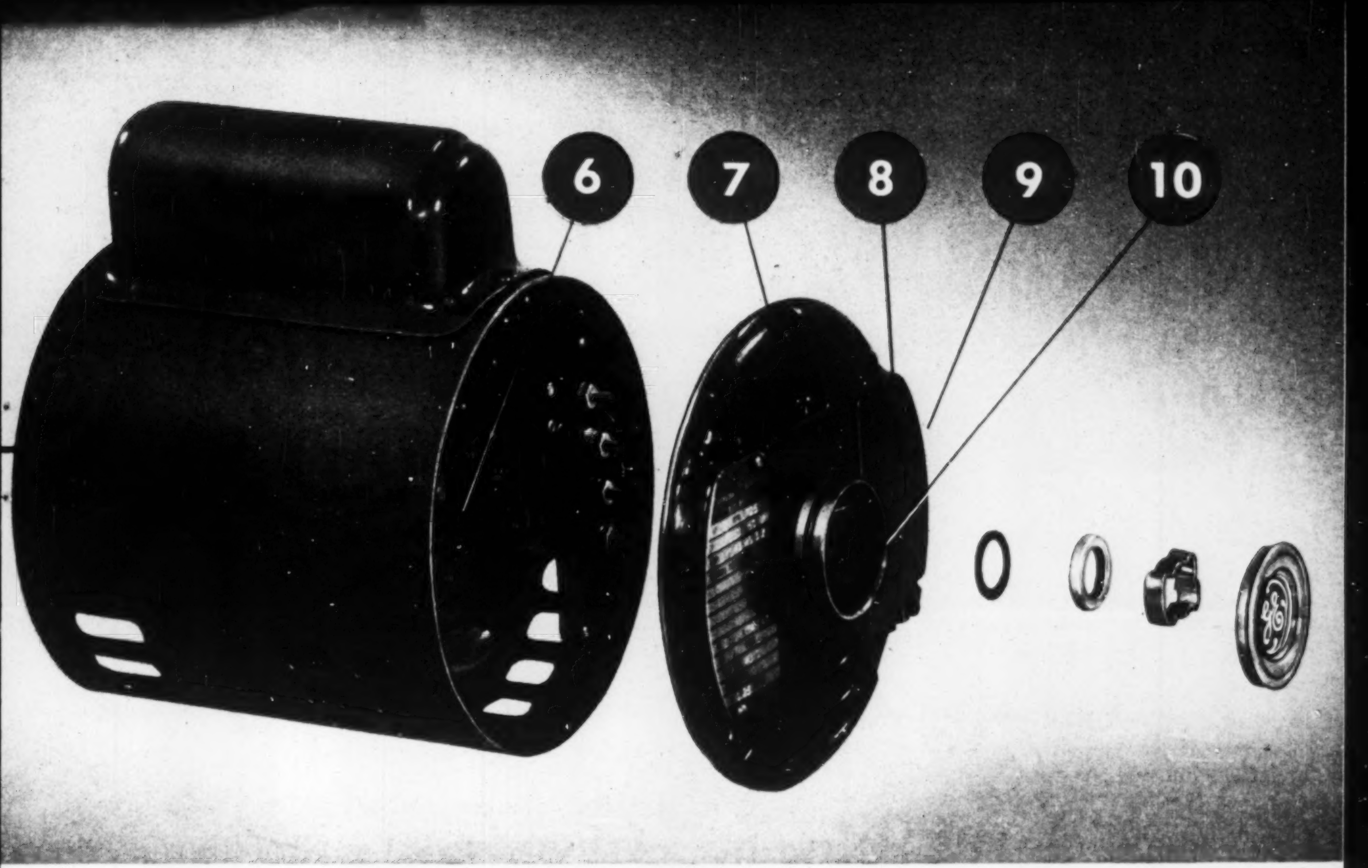
Now you can improve your product, speed assembly time, cut your handling and shipping costs.

Want more good reasons for using this new motor? Contact your nearest G-E Apparatus Sales Office or write for bulletin GEA-5567. Address Section 700-121, General Electric Co., Schenectady 5, N. Y.

GENERAL ELECTRIC

SMALLER . . .





6. STURDY!—Another G-E innovation: shell is expansion-fitted to stator: a strong *unit* assembly.

7. LESS MAINTENANCE! Spacious oil reservoirs—no lubrication required on some applications.

8. CONVENIENT!—Roomy terminal box—cover has connection and lubrication instructions.

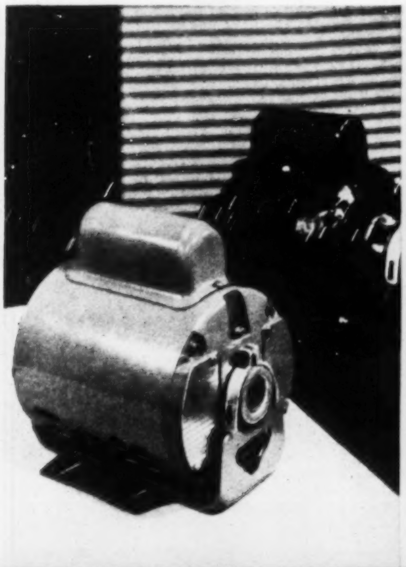
9. RIGID!—This motor has strong, lightweight aluminum end shields especially rib-reinforced.

10. FLEXIBLE—Cradle bases—*solid* or resilient—facilitate easy mounting in any position.

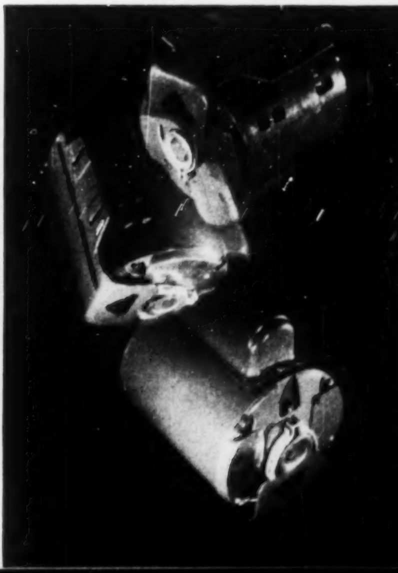
the all-new G-E Fhp motor!

LIGHTER . . .

BETTER LOOKING . . .



MORE VERSATILE!



It's better than *Just Good*

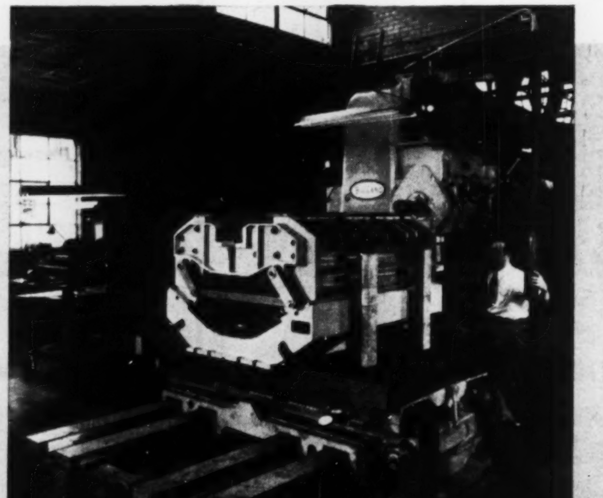
when considering your new machines, *demand*

this 4-way bed Bullard Horizontal Boring, Milling and Drilling Machine

At Best Tool and Engineering Company, Detroit, Michigan where they are making Packard Motor Car Co. fixtures for milling upper half of aircraft engine crankcases, they rely upon the ruggedness and accuracy of these Bullard Horizontal Boring, Milling and Drilling machines for the finest of workmanship in their products.

Even though these fixtures are not a production run, Best Tool and Engineering have found that the versatility and reliability of these Bullard machines provide a profitable, precision method for machining.

A satisfied customer is the best proof of a machine's performance and ability.

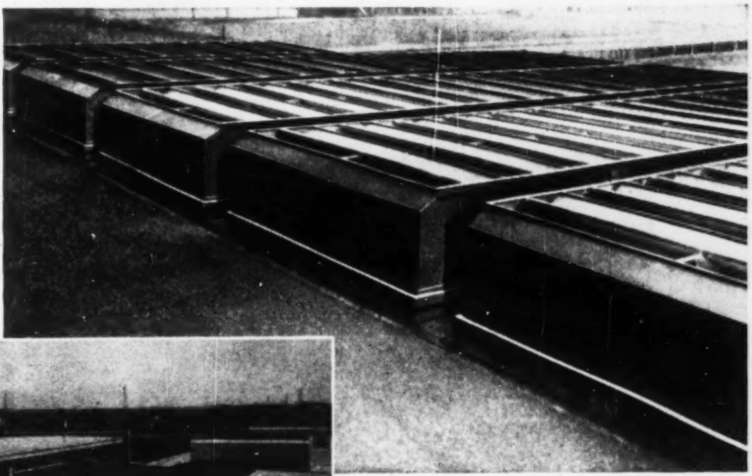


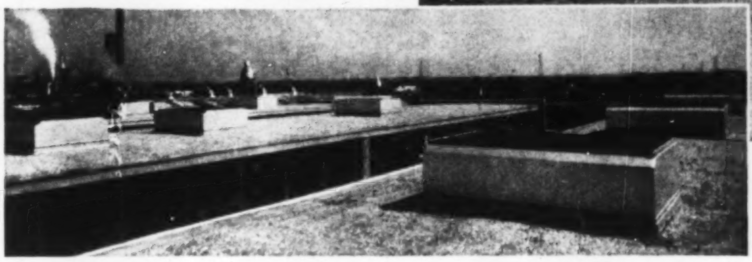
- **Rigidity of BULLARD 4-Way bed CONSTRUCTION**
- **Advantages of BULLARD NON-METALLIC bearing surfaces**
- **Smooth operation from HYDRO-DYNAMIC Coupling Drive**
- **Machine versatility BULLARD inbuilt ACCURACY.**

The **BULLARD** *Company*

BRIDGEPORT 2, CONNECTICUT

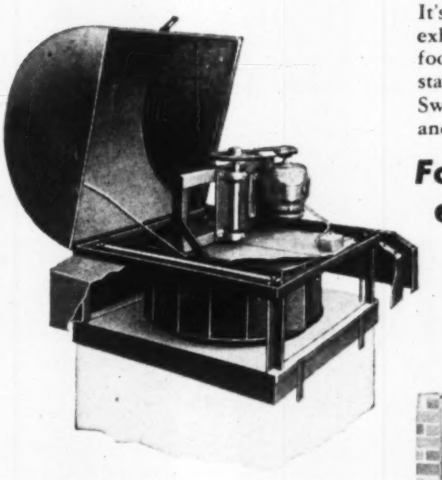
Swartwout provides complete Roof Ventilator selection





See our catalog in Sweet's Engineering or Architectural Files

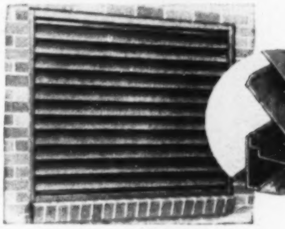
For Gravity Service—the AIRMOVER, for example



Make use of Airmover's many advantages for a large variety of buildings. It's the most widely used equipment for large scale ventilation. Has great exhaust capacity without power cost—is lowest cost ventilator per square foot of roof opening. Low, spreading contour eases roof load; avoids stays and guy wires. Only 32″ high from curb to highest part . . . Other Swartwout Gravity Ventilators: the Dexter Heat Valve, Gravity Valvent, and Rotary—the original rotating ventilator.

For Power Service—the AIRLIFT, for example

Airlift provides efficient high capacity duct exhaust at very low noise levels. Completely balanced centrifugal fan runs at low tip speed. Ventilator design features streamlined fan inlet, oversize outlet opening. Wide range of sizes and capacities, including Airlift Junior for CFM under 1000 . . . Other Swartwout Powered Ventilators: Airjector, Powered Valvent, Ject-O-Valve, Whirlout.



For Fresh Air Intake—the AIRLOUVER

Custom-made for each job *without premium cost*, the weatherproof Airlouver provides unusual adaptability—enables you to fill any opening with equal-size louver units. Made in adjustable or fixed styles . . . Where *standard* sizes are suitable, we offer Swartwout Industrial Louvers.

Write for bulletins on any of these

For Gravity Service

●

Airmover
Heat Valve
Rotary
Gravity Valvent

●

Louvers
Airlouver
Industrial

For Power Service

●

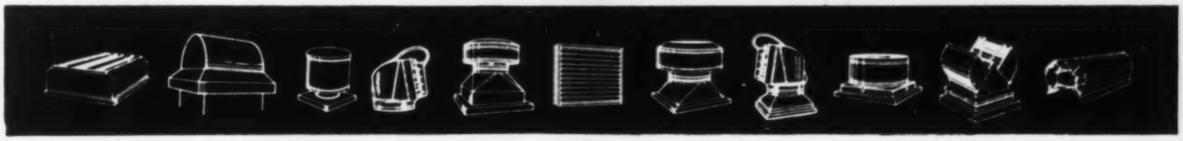
Airjector
Powered Valvent
Ject-O-Valve
Whirlout
Airlift
Airlift Jr.

18568 Euclid Avenue, Cleveland 12, Ohio

The Swartwout Co.

Roof Ventilators and Ventilating Louvers

POWER PLANT EQUIPMENT • PROCESS INDUSTRY CONTROLS



The model BR Diffuser is an adjustable multicone ceiling outlet that embodies modern styling, rigid construction, easy installation and is easily adjustable for all air patterns.

The modern design compliments any interior styling. The three standard neutral finishes, available at no extra cost, will blend and harmonize with any interior color scheme. Special finishes of all types are available on special order.

CARNES

MODEL BR CEILING OUTLET

1. MAXIMUM DIFFUSION EFFICIENCY
•
2. FOR ALL HEATING AND COOLING SYSTEMS
•
3. EXTREMELY QUIET OPERATION
•
4. STURDY CONSTRUCTION
•
5. COMPLETE RANGE OF SIZES
•
6. MODERN STYLING
•
7. ATTRACTIVELY PRICED

EASY TO INSTALL

Easy installation is one of the many unique features of the Model BR Diffuser. The adjustable cone assembly is made as a complete unit, and to remove it from the ceiling plate requires only turning it a few degrees counterclockwise. No tools of any kind are needed, thus avoiding the danger of marring the finished surface.

This feature is very important when balancing the system, as the relative position of the adjustable cones is not disturbed, when the cone assembly is removed to adjust dampers.

BULLETIN NO. 201 GIVES FULL SPECIFICATIONS AND PERFORMANCE DATA. SEND UPON REQUEST.

SIMPLE
TO
ADJUST

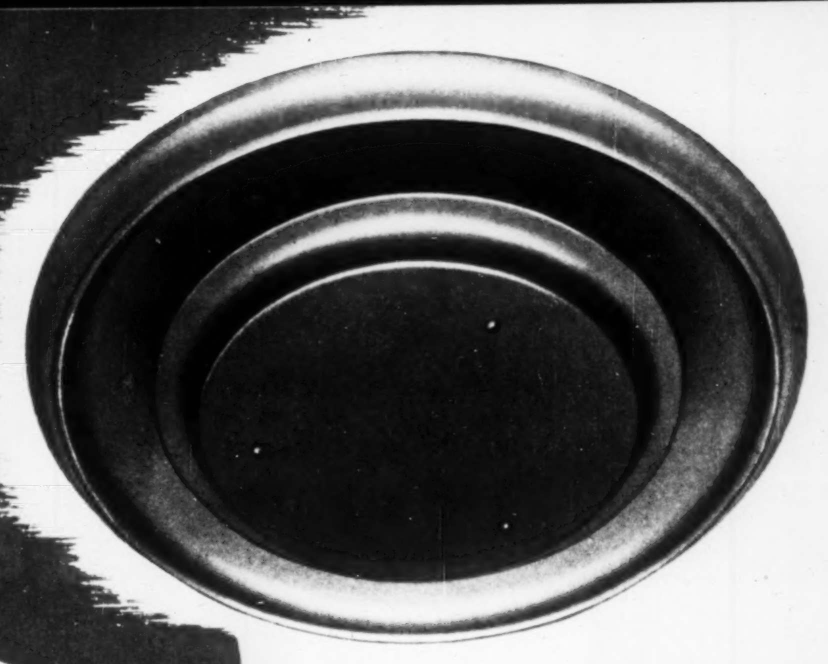
•

NO
TOOLS
NEEDED

TURNING CENTER PLATE CHANGES AIR PATTERN. ANY DESIRED PATTERN FROM VERTICAL TO HORIZONTAL IS QUICKLY AND EASILY OBTAINED.

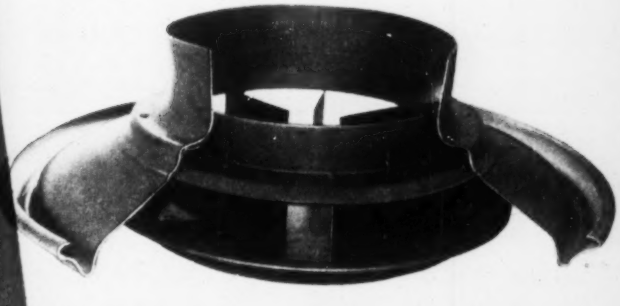
The Model CR Round Ceiling Diffuser is an adjustable diffuser that is attractively styled, rigidly constructed, and embodies features for easy installation and adjustment.

Available in three standard neutral finishes, at no extra cost, that will blend and harmonize with any interior color scheme. Special finishes of all types are available on special order.



CARNES

MODEL CR CEILING DIFFUSER



The Model CR Round Ceiling Diffuser is equally adaptable to flush ceiling or exposed Duct installation. Complete adjustment of the air pattern from horizontal to vertical is possible thru adjustment of the center plate. The hinged vanes inside the diffuser give complete control over the volume of air, and can be adjusted to act as Air Sectorizing Baffles when it is necessary to install the diffuser near a wall, columns, or other obstructions. The Illustration shows the location of the adjusting vanes.

COMPLETE LINE OF ACCESSORIES ARE AVAILABLE

●

INTEGRAL VOLUME CONTROLS

●

DAMPERS — ALL TYPES

●

TURNING VANES

●

EQUALIZING DEFLECTORS

●

ANTI-SMUDGE RINGS

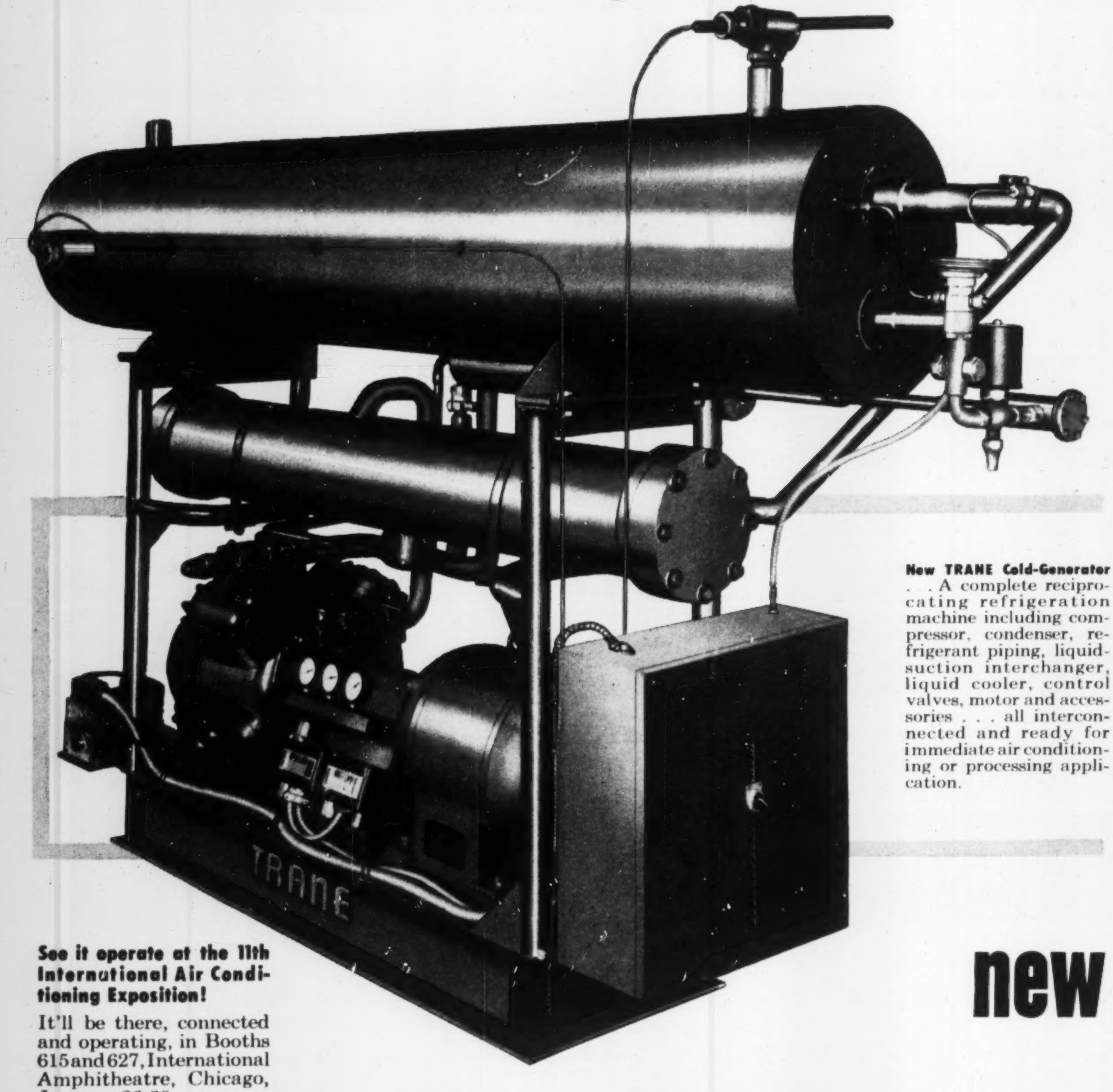
BULLETIN NO. 301 GIVES COMPLETE SPECIFICATIONS AND PERFORMANCE DATA.

●

SPECIAL BULLETINS GIVE FULL INFORMATION ON OTHER STYLES; SQUARE AND RECTANGULAR DIFFUSER, DIFFUSERS FOR HIGH PRESSURE, ETC. INFORMATION AVAILABLE ON REQUEST.

W. R. CARNES COMPANY
VERONA, WISCONSIN

Announcing the TRANE completely packaged water



New TRANE Cold-Generator . . . A complete reciprocating refrigeration machine including compressor, condenser, refrigerant piping, liquid-suction interchanger, liquid cooler, control valves, motor and accessories . . . all interconnected and ready for immediate air conditioning or processing application.

See it operate at the 11th International Air Conditioning Exposition!

It'll be there, connected and operating, in Booths 615 and 627, International Amphitheatre, Chicago, January 26-30.

new

MANUFACTURING ENGINEERS OF AIR CONDITIONING, HEATING AND VENTILATING

COLD-GENERATOR chiller.....ready to install!

COMPLETELY WIRED, PIPED, REFRIGERANT-CHARGED

Now you can install a complete refrigeration cycle, factory engineered, factory assembled, factory tested, factory guaranteed. A single unit providing chilled water for air conditioning. A single unit providing undivided responsibility!

In other words, you can now install mechanical refrigeration for air conditioning systems without refrigerant piping, on-the-job pressure testing, evacuating, dehydrating or refrigerant-charging.

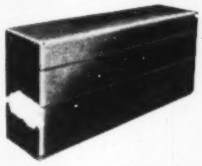
In this one compact unit—the new Trane Cold-Generator—you get the reciprocating compressor, condenser, refrigerant piping, liquid cooler, control valves, motor and accessories. These field-proven components are wired, piped and refrigerant-charged. All are carefully engineered and *exactly matched.*

Rugged, yet lightweight, Trane Cold-Generators are compactly built for small space installation. Ten sizes—from 10 to 100 tons—all requiring only simple plumbing and electrical connections to put them in service.

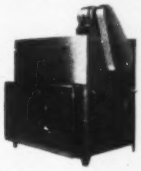
It is now easy for you to install efficient, economical, dependable air conditioning systems in office buildings, theaters, hotels, auditoriums, department stores . . . everywhere!

Get complete information at once on this new idea in packaged refrigeration. Learn how the Trane Cold-Generator makes air conditioning as easy to install as heating! Packaged refrigeration brings you packaged responsibility—and packaged profits too!

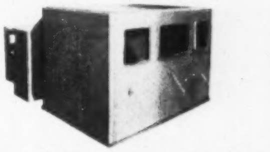
Combines with these Trane products for a complete air conditioning system . . .



UniTrane . . . Units with individual control of heating, cooling for multi-room system.



Climate Changers . . . Basic air conditioners containing coils, fans, humidifiers, filter, dampers.



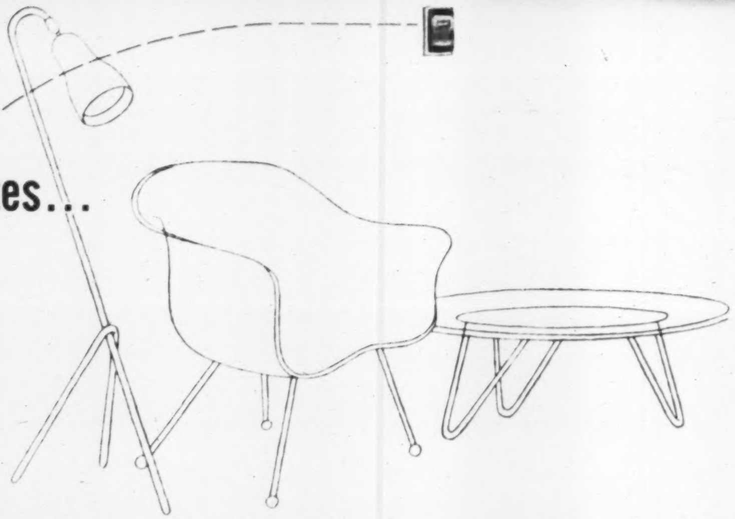
Multi-Zone Climate Changer . . . Single unit provides different temperatures simultaneously to as many as 8 zones.

TRANE Cold-Generator

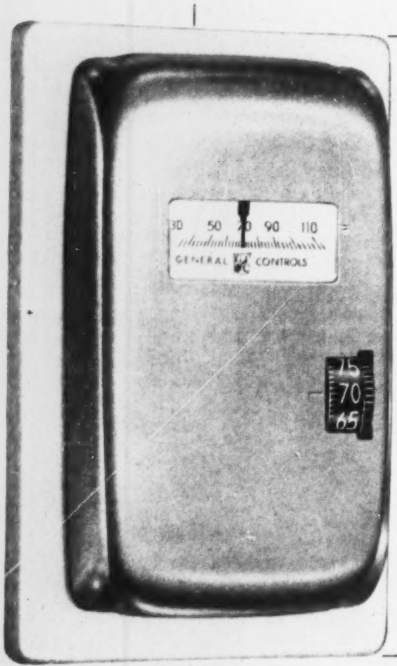
brings you chilled water for air conditioning in a package

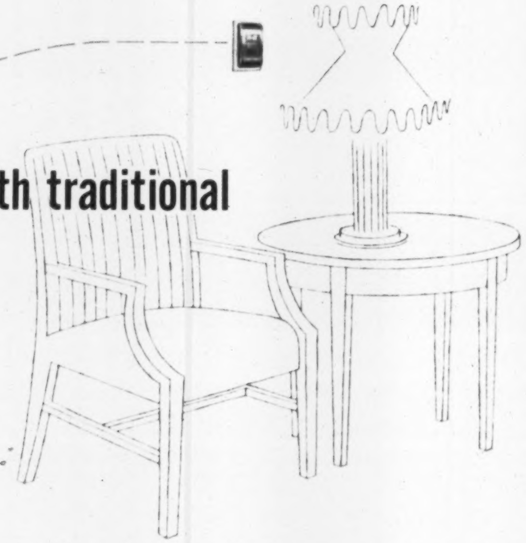
EQUIPMENT The Trane Company, La Crosse, Wis • East. Mfg. Div., Scranton, Penn • Trane Co. of Canada, Ltd., Toronto • 80 U. S. and 14 Canadian Offices

Beauty that harmonizes...



with modern





with traditional

with provincial

General Controls Metrotherm "belongs" in any room, with its flush-design, all metal case in rich, ever-lasting satin-chrome finish, harmonizing with any interior decorative theme. Because of this durable all-metal case, there is no fragile painted surface to chip, crack, show finger marks or smudge. Because it is sensitive to both radiant and convected heat, it holds accurate temperature level at all times.

New for '53

- *easy-to-read temperature dial has permanent white numerals imbedded in plastic*
- *new clear-vision thermometer*

Best for you...

and your customer, too

General Controls

B-60

Self-Generating

Heat Control System

With the addition of the new *700 millivolt pilot generator*, this completely self-powered control system now fits the greatest range of heat control applications. Since the origination of the B-60 self-generating package sets by General Controls 14 years ago, hundreds of thousands of these controls have given trouble-free performance. No outside current required. No power-failure service calls. Quiet operation, accurate temperature control, positive safety. A variety of standard and timer thermostats available.

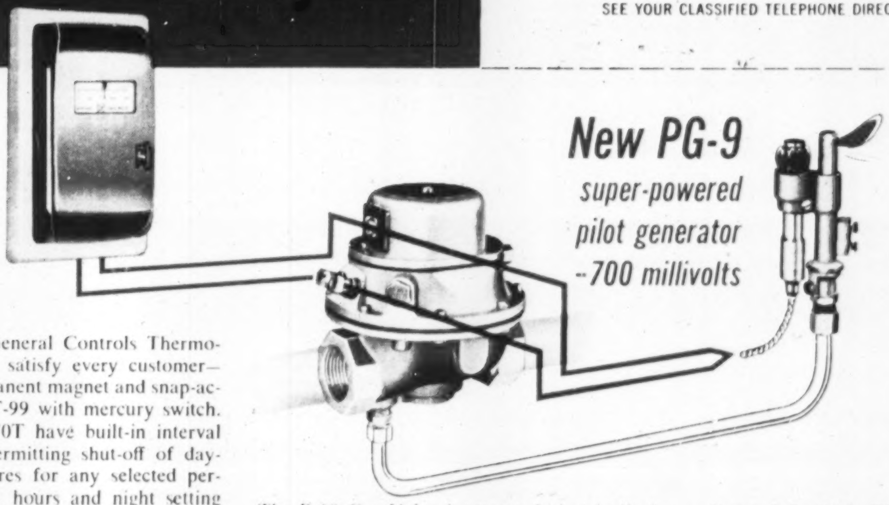
General Controls

GLENDALE 1, CALIFORNIA • SKOKIE, ILLINOIS

Manufacturers of Automatic Pressure, Temperature, Level and Flow Controls for Heating, Home Appliances, Refrigeration, Industrial and Aircraft Applications.

FACTORY BRANCHES IN 32 PRINCIPAL CITIES –

SEE YOUR CLASSIFIED TELEPHONE DIRECTORY

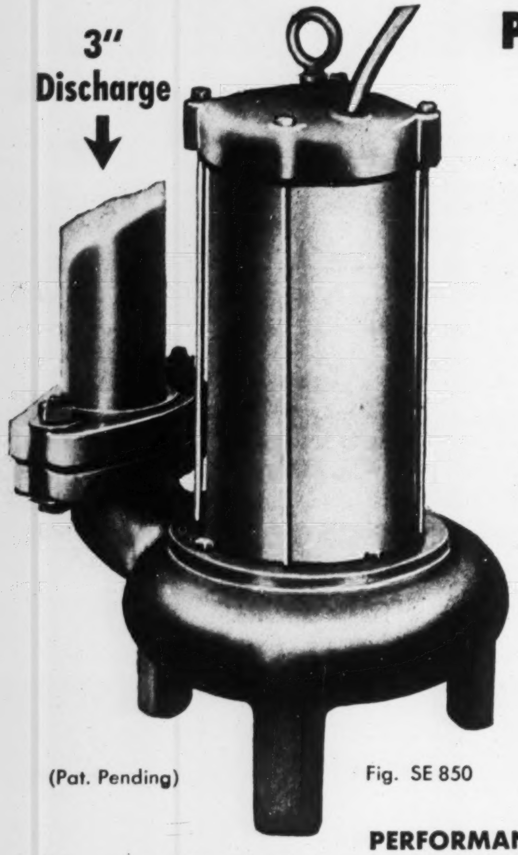


A variety of General Controls Thermostats helps you satisfy every customer—T-70 with permanent magnet and snap-action contacts—T-99 with mercury switch. T-70X and T-70T have built-in interval Swiss timers permitting shut-off of daytime temperatures for any selected period up to 13½ hours and night setting for minimum temperatures. T-70 and T-99 Thermostats also available for 24-volt circuits.

The B-60 Gas Valve is operated electrically by the current supplied from the pilot generator. It opens and closes gas fuel line at the demand of a room thermostat or limit control. Valve closes if pilot is extinguished, providing positive safety control. The B-60 Valves are standard for all gases. Available in all standard pipe sizes from ⅜" to 1½".

General Controls PG-9 Pilot Generators perform three jobs—(1) main burner ignition, (2) pilot safety, and (3) millivolt generation to operate the control system. Maximum millivolt generation (700 mv) obtained with low pilot gas consumption.

weil SUBMERSIBLE SCREENLESS SEWAGE EJECTORS



(Pat. Pending)

Fig. SE 850

PUMP ALL HOUSEHOLD WASTE

Designed

TO OPERATE UNDER WATER

No moisture can damage pump or motor

FOR GAS-TITE INSTALLATIONS

FOR INSTALLATION IN LIMITED SPACE

FOR BELOW FLOOR LEVEL INSTALLATION

Discharge pipe and water-proof electric cable are all that extend above the floor

FOR DIRT-PROOF OPERATION

No dirt or foreign matter can affect operation of pump or motor

FOR ECONOMICAL INSTALLATION

Is easily installed in a tile or cast iron basin

Pump may be installed in underground vault outside of building.

A COMPLETE PACKAGE AT LOW COST

STOCKED BY YOUR JOBBER

For Residential Installation — 3" discharge — ½-¾-1 HP.
Dimensions: Dia. 17"; Hgt. 25" See Bulletin SE 850
For Heavy Duty Installation — 4" discharge — 1½-2-3 HP.
Dimensions: Dia. 23"; Hgt. 28 See Bulletin SE 860

PERFORMANCE AND SELECTION TABLE

Unit No.	Horse Power	Capacity GPM	Discharge Head in Feet	Est. Cost Monthly Operation	Dimensions*			Recommended Min. I.D. of Basin
					Hgt.	Dia.	Wgt.	
SE820	½	35	31	$0.60	25"	17"	142#	24"
		50	20					
		75	15					
SE825	¾	50	27	$0.95	25"	17"	142#	30"
		75	24					
		100	21					
SE830	1	75	26	$1.31	25"	17"	142#	36"
		100	21					
		150	15					

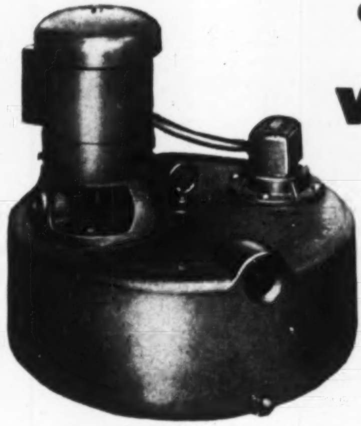
See the radically new *SUBMERSIBLE SEWAGE EJECTOR* with the BLADELESS Impeller, in actual operation at the HEATING and VENTILATING EXPOSITION.

Booths 2-805 and 2-807 – On the SECOND FLOOR

11th International Heating and Ventilating Exposition

LOW PRESSURE SYSTEM *Condensate Pumps*

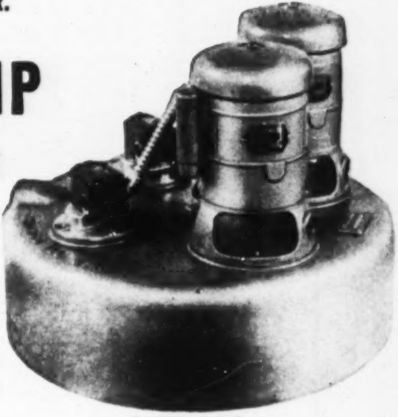
Capacities 500 to 10,000 sq. ft. E.D.R.



SINGLE UNIT
Fig. 302A
10 Gal. Receiver for Single Units
Diameter 21"
Hgt. of Return above floor 6⅞"

weil TVC PUMP

LOW RETURN CONNECTION
LOW SPEED, LONG LIFE
CAST IRON RECEIVER
LOW WATER
LINE



DUPLEX UNIT
Fig. 303B
15 Gal. Receiver for Single or Duplex Units
Diameter 25½"
Hgt. of Return above floor 7³⁄₁₆"

TVC SELECTION TABLE

Unit Number	Max. Sq. Ft. E.D.R.	Discharge Pressure At Pump	G.P.M. From Radiation	Cap. of Pump	H.P. of Motor	Return Inlet	Pump Discharge	Dia. of Receiver	Height of Unit
TVC 13	500	20 lbs.	.25	1.0 GPM	1/4	2"	1"	21"	21"
TVC 19	750	20 lbs.	.38	1.5 GPM	1/4	2"	1"	21"	21"
TVC 23	1000	20 lbs.	.5	1.5 GPM	1/4	2"	1"	21"	21"
TVC 29	2000	20 lbs.	1.0	3.0 GPM	1/4	2"	1"	21"	21"
TVC 35	4000	20 lbs.	2.0	6.0 GPM	1/4	2"	1"	21"	21"
TVC 41	6000	20 lbs.	3.0	9.0 GPM	1/2	2"	1"	21"	23½"
TVC 47	8000	20 lbs.	4.0	12.0 GPM	1/2	2"	1"	25½"	23½"
TVC 52	10000	20 lbs.	5.0	15.0 GPM	3/4	2"	1"	25½"	27½"

Intermediate Sizes Based Upon Discharge Pressure Required Are Available

See Bulletin TVC-300-C for Full Specifications

OTHER WEIL CONDENSATE PUMPS

SRC Pumps (Bulletin SRC-450)
Pressures: 10 to 60 P.S.I.
Capacity: 1000 to 50,000 Sq. ft. EDR
Receiver: Steel
Features: Centrifugal pump, factory assembled, compact, conserving space; low return connection.

TR Pumps (Bulletin TR-100)
Pressures: 10 to 125 P.S.I.
Capacity: 1000 to 150,000 Sq. ft. EDR
Receiver: Steel or cast iron
Features: Designed for high and low pressure systems; with full automatic controls including automatic make-up can be furnished for boiler feed service.

NRG Pumps—Underground Type (Bulletin NRG-200)
Pressures: 10 to 60 P.S.I.
Capacity: 1000 to 150,000 Sq. ft. EDR
Receiver: Cast iron
Features: Receiver can be installed in ground (concrete pit not required) catching all below-the-floor returns while motor and controls are protected above ground.

WEIL SEWAGE EJECTORS AND SUMP PUMPS

SCREENLESS HEAVY DUTY SUBMERGED TYPE SEWAGE EJECTOR (Bulletin C-900)
Capacities: 50 to 1500 GPM

POWERHOUSE Cellar Drainer Sump Pump (Bulletin SI 540)
A bronze fitted sump pump with 1¼" discharge; for sumps to two feet.

ELECTRIC WATER BOY Sump Pump (Bulletin F-501)
1¼" and 1½" Discharge; settings to 8 ft.; capacities to 65 GPM

F 2 SUMP PUMP (Bulletin F 600 B)
2" Discharge; settings to 12 ft.; capacities to 100 GPM

B700 HEAVY DUTY Sump Pump (Bulletin B-700)
Discharges to 5"; capacities to 1500 GPM; single or duplex; handles HOT or COLD water.

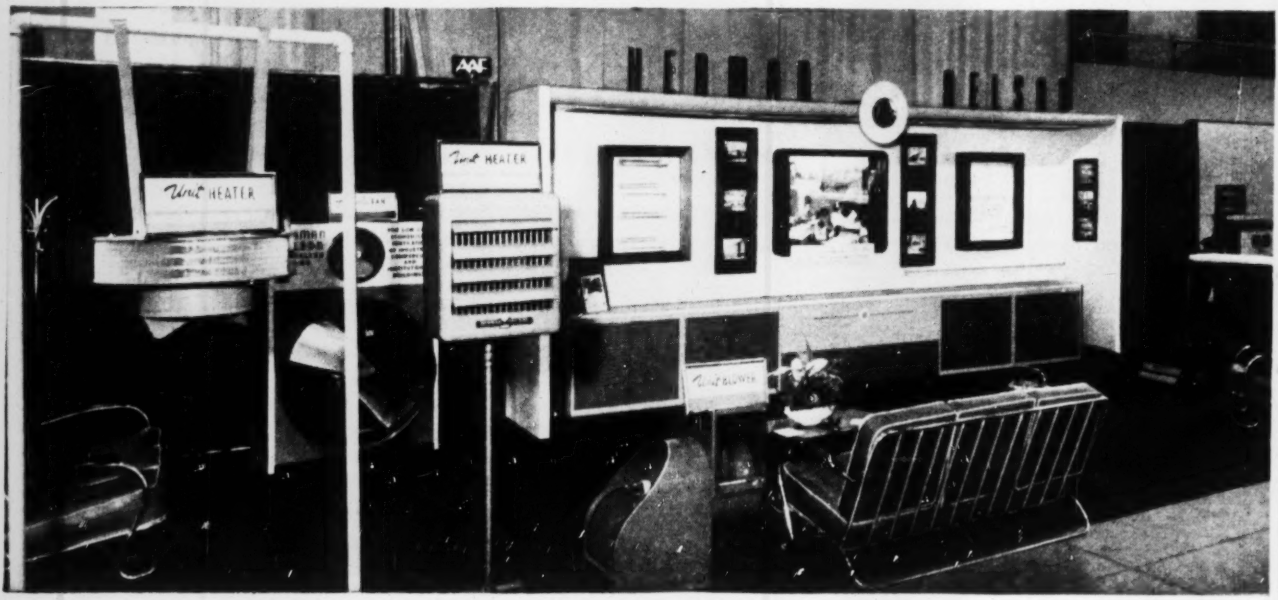
SUBMERSIBLE Cellar Drainer (Bulletin SS-800)
Designed to operate under water; bronze fitted; 1¼" discharge; operates in sumps to 20 ft. deep.

weil PUMP CO. • 1530 N. Fremont St. • Chicago, Ill.

Show Headquarters for Air Cleaning.

AAF
American Air Fil
AMERICAN AIR FILTER CO. INC
LOUISVILLE

These photographs show the American Air Filter and Herman Nelson displays at the Philadelphia show.


AAF
HERMAN NELSON
Unit HEATER
Unit HEATER

American Air Filter
COMPANY, INC.
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Booths
735
737
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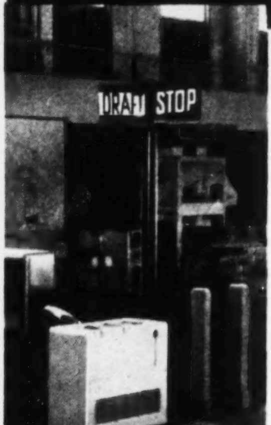

We've planned our show for you. It will be bigger and better than the successful Philadelphia show . . . with more new things to see . . . more useful information . . . and more practical ideas for *your* business!

Here you will see the world's greatest and the only *complete* line of AAF Air Filters and Electronic Precipitators . . . all in one place.

Here, too, will be concentrated the great HERMAN NELSON line of Unit Heaters—Unit Blowers—Propeller and Centrifugal Fans and the exclusive DRAFT|STOP Unit Ventilators.

Plan To Make AAF Your Show Headquarters . . .
We'll Be Ready To Greet You.

AAF

PLAN *with* BALDOR

Your Engineering Staff PLUS Baldor Motor Specialists make a good strong team.

In planning new products and redesigning equipment, let the helpful cooperation of the Baldor Engineering Staff serve as a supplementary section of your own Engineering and Production Departments.

In our quarter-century of diversified motor-applications experience, we have probably solved — for other manufacturers — the very problems that now confront you on your drawing boards.

PLAN WITH BALDOR — the Better Motor for a Better Product.

BALDOR ELECTRIC COMPANY, 4353 Duncan Ave., ST. LOUIS 10, MO.
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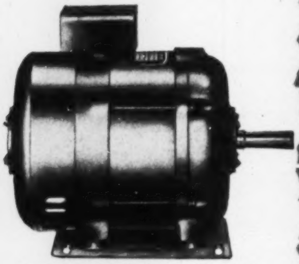
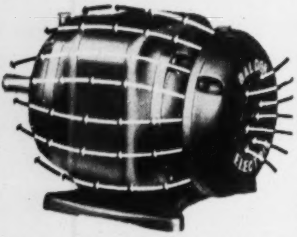


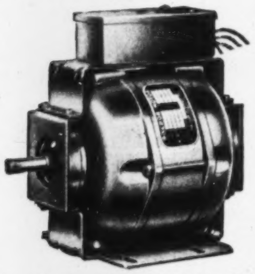
Open, drip-proof construction; 1/6 to 1/3 h.p., 1 phase, 3 phase and direct current.

Streamcooled, round frame, 1/3 to ¾ h.p., 1 phase, 3 phase and direct current.

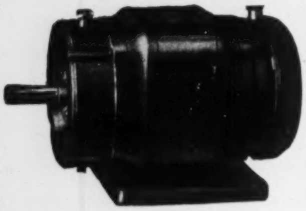


Streamcooled, polyphase, 1 to 20 h.p. (arrows indicate forced air cooling over entire exterior of motor frame).

Streamcooled, single phase, ¾ to 7½ h.p.

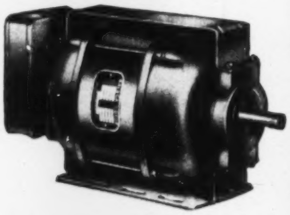


Resilient-mounted, open, drip-proof, for belt drive; 1/10 to ¾ h.p., single phase.



Streamcooled face mounted; 1 phase, 3 phase and direct current.

Streamcooled, direct current, 1 to 5 h.p.

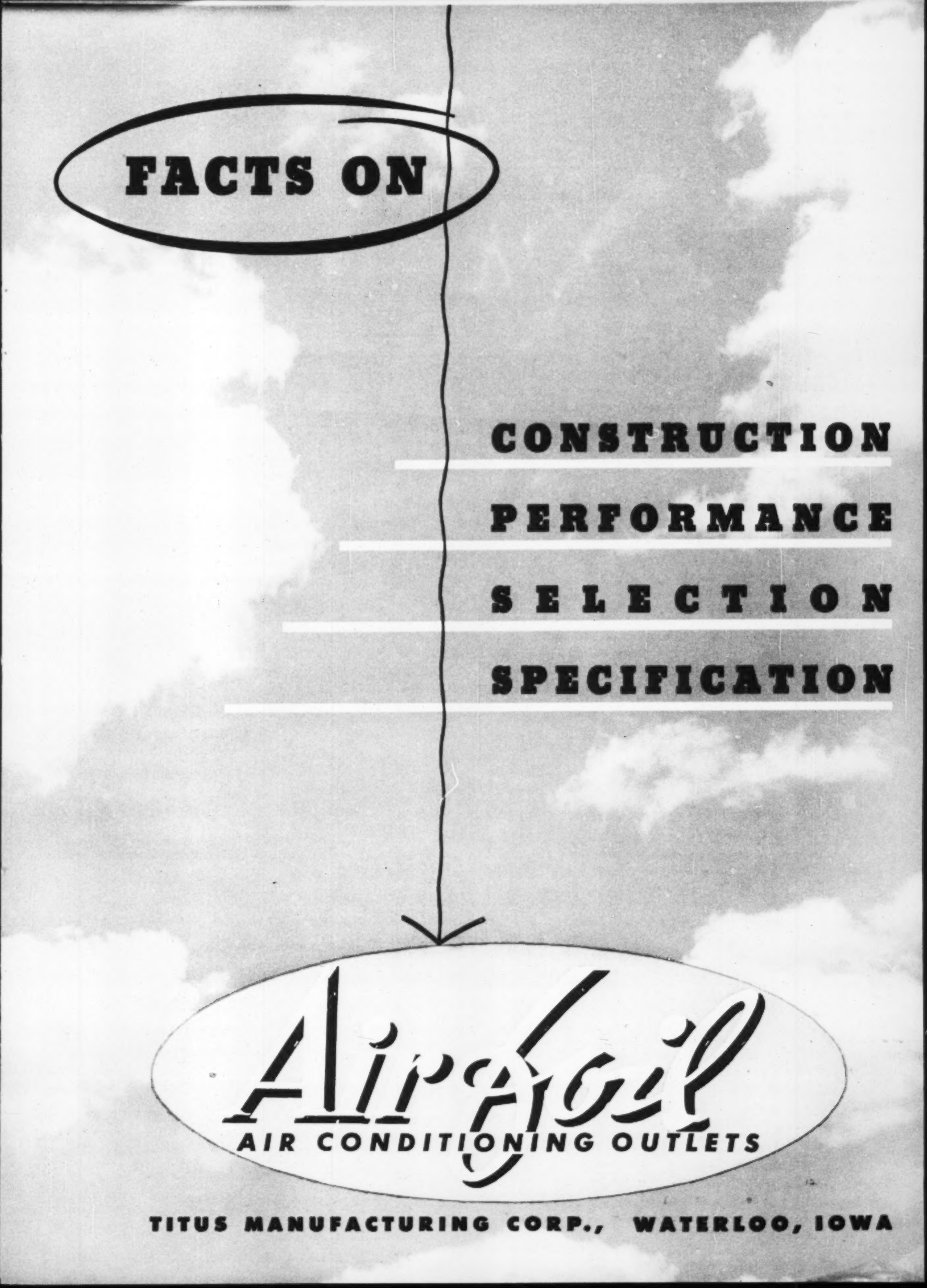


Resilient-mounted fan motor 1/30 to ½ h.p., 1 phase; ⅛ to ½ h.p., 3 phase.

Baldor builds a complete line of bench and pedestal type Grinders, 6" to 12" wheels, ¼ to 3 h.p., including a special Carbide Tool Grinder.

Streamcooled, face-mounted with tripod; for vertical mounting.

Baldor
BETTER MOTORS
FOR MORE THAN A QUARTER OF A CENTURY



FACTS ON

CONSTRUCTION
PERFORMANCE
SELECTION
SPECIFICATION

Airfoil

AIR CONDITIONING OUTLETS

TITUS MANUFACTURING CORP., WATERLOO, IOWA

AirFoil

DIRECTIONAL OUTLETS

2 WAY CONTROL

Series No. 1 and No. 271 are 2-Way control. They have one set of individually adjustable louvers. Louver surface is smooth as glass. This smoothness assures lower wind resistance and minimum turbulence. All Airfoil Registers and Grilles have one piece frames with special patented concealed reinforcements.

Unsightly mullions and butted construction are eliminated. This superior design and construction gives a neater appearance. Increases air diffusion efficiency. Decreases noise and loss of free area caused by old type mullions. Sponge rubber gaskets and countersunk screw holes are standard on all Airfoil directional outlets.

4 WAY CONTROL

4-Way directional outlets provide complete control of air stream. A quick simple adjustment creates any air pattern desired. No. 2, No. 270, and No. 8 Series are available as illustrated at right. Note these outstanding features . . . 1. Smooth as glass Airfoil louvers. 2. Solid section louver construction for minimum noise, — streamlined. No sharp corners, no holes, no crevices. 3. One-piece, extra heavy frame. 4. Air-tight rubber gasket to prevent air leakage. 5. Extra wide 1-1/4" beveled edge border. 6. Countersunk screwholes. NOTE: when shut-off or damper control, is required, we refer you to Series No. 4, 274 and 276 at far right.

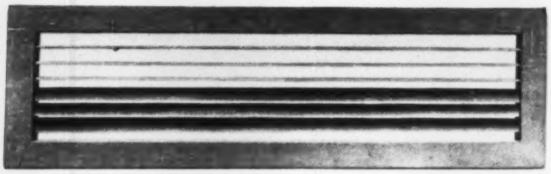
AirFoil

VOLUME CONTROLLERS

The Titus Airfoil line provides a complete selection of units for absolute control of air stream. These units can be installed directly behind the grille, or in the junction of a duct and a branch take-off. The AG-25 provides individually adjustable volume control. The AG-35, an opposed action volume controller, gives faster, easier balancing of a system. The AF-325 combines grille with volume controller. All of these Units have the features which provides complete draftless air distribution and long satisfactory service.

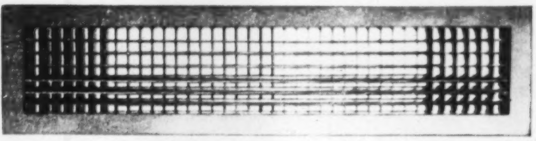
RETURN AIR GRILLES

These return air grilles and registers are the finest available. All have extra heavy gauge louvers which are hemmed for added strength and better appearance. Blades are smooth and easily cleaned with a soft cloth. Greater savings are possible because of the larger free area. Standard finish on all registers and grilles is a grey lacquer primer. A large selection of other colors may be obtained. These are available at slight extra cost. More detailed information can be obtained by sending for complete Airfoil Catalog. This shows dimensional drawings, engineering and selection data, and price lists.



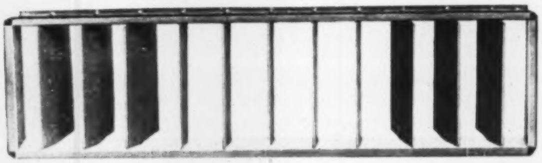
SERIES No. 1

A high quality commercial type grille. Has one set of individually adjustable AIRFOIL louvers. 3/4" spacing. Louvers are 1" deep for complete control of air stream. Specify L-1 for louvers parallel to the long dimension — S-1 for louvers parallel to the short dimension. For closer 1/2" spacing, specify L-7 or S-7.



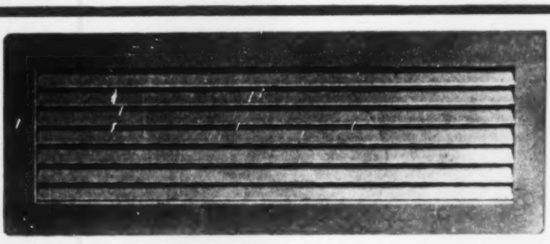
SERIES No. 2

Highest quality four-way directional grille. Two sets extra deep, 1" AIRFOIL louvers. Each individually adjustable. 3/4" spacing. L-2 features front louvers parallel to the long dimension, rear louvers parallel to the short dimension. S-2 features front louvers parallel to the short dimension, rear louvers parallel to the long dimension.



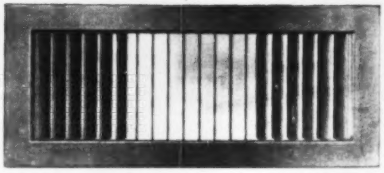
AG-25

Designed to fit into duct behind grille. Insures even distribution of air over grille face. Individually adjustable AIRFOIL deflecting louvers. Deflecting blades constructed so that either half of any blade is adjustable, independent of the other half. Assembled with the axis of blades off center to allow rear louvers to extend farther back into air stream. Held in place by friction. Installs quickly—easily.



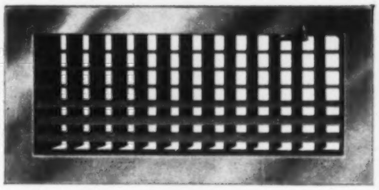
SERIES No. R-230

Designed to match Airfoil Air Conditioning Outlets. Rugged construction — finer appearance. Over 80% free area. Deep fins with easy curved deflection on 3/4" spacing. Standardized at 0 or 45 degrees. Most easily cleaned of any return air grille available. Specify RL-230 for blades parallel to the long dimension, RS-230 for blades parallel to the short dimension.



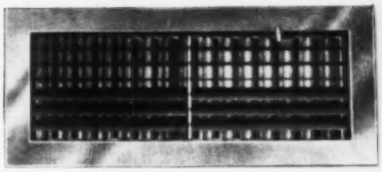
SERIES No. 271

Neat appearance, outstanding efficiency. One set individually adjustable AIRFOIL louvers. 3/4" spacing. Louvers 3/4" deep. Specify L-271 for louvers parallel to the long dimension; S-271 for louvers parallel to the short dimension.



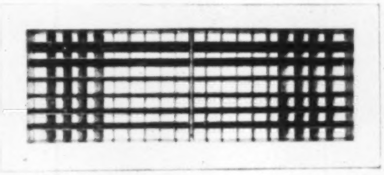
SERIES No. 4

High quality AIRFOIL multi-shutter register. Front louvers extra deep, 1", spaced on 3/4" centers, each individually adjustable. Rear shut-off blades on 1" centers. Specify L-4 for front blades the long way, damper blades the short way; S-4 for front blades the short way, damper blades the long way.



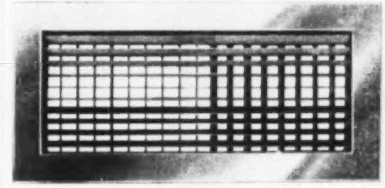
SERIES No. 274

Outstanding register combines AIRFOIL double directional grille with a multi-shutter damper. Front louvers spaced on 3/4" centers, 3/4" deep. Rear shut-off blades on 1" centers. Available as L-274 with front blades the long way, damper blades the short way, or S-274, front blades the short way, rear blades the long way.



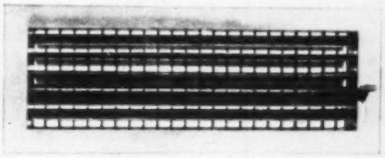
SERIES No. 270

Outstandingly efficient. Competitively priced. Two sets individually adjusted AIRFOIL louvers, 3/4" deep on 3/4" centers. Specify L-270 for front louvers the long way, rear louvers the short way, or S-270 for front louvers the short way, rear louvers the long way.



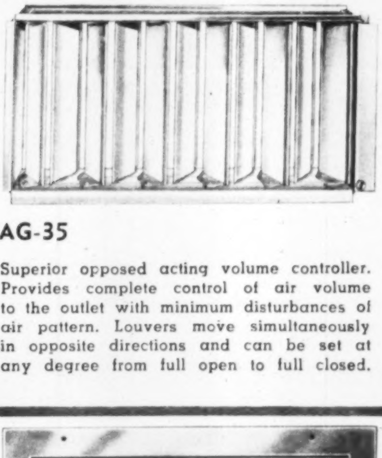
SERIES No. 8

Finer appearance with closer spacing. Two sets of individually adjustable AIRFOIL louvers. L-8 features front louvers parallel to the long dimension, rear louvers parallel to the short dimension. S-8 features front louvers parallel to the short dimension, rear louvers parallel to the long dimension.



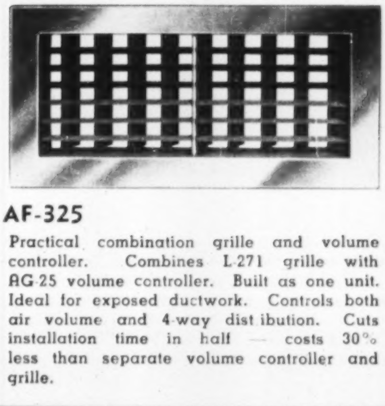
SERIES No. 276

Assures maximum directional control, positive volume control and shut-off at lowest price. Two front sets of AIRFOIL louvers individually adjustable. Spaced on 3/4" centers. Rear shut-off blades interlock and are spaced on 1" centers. Available as L-276 with front louvers parallel to the long dimension, and S-276 with front louvers parallel to the short dimension.



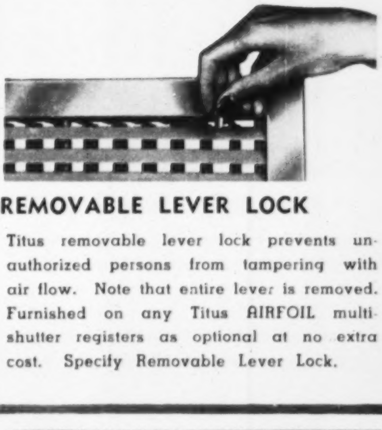
AG-35

Superior opposed acting volume controller. Provides complete control of air volume to the outlet with minimum disturbances of air pattern. Louvers move simultaneously in opposite directions and can be set at any degree from full open to full closed.



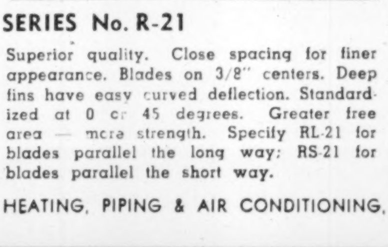
AF-325

Practical combination grille and volume controller. Combines L-271 grille with AG-25 volume controller. Built as one unit. Ideal for exposed ductwork. Controls both air volume and 4-way distribution. Cuts installation time in half — costs 30% less than separate volume controller and grille.



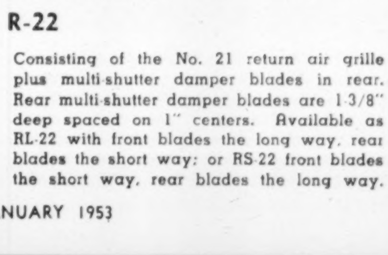
REMOVABLE LEVER LOCK

Titus removable lever lock prevents unauthorized persons from tampering with air flow. Note that entire lever is removed. Furnished on any Titus AIRFOIL multi-shutter registers as optional at no extra cost. Specify Removable Lever Lock.



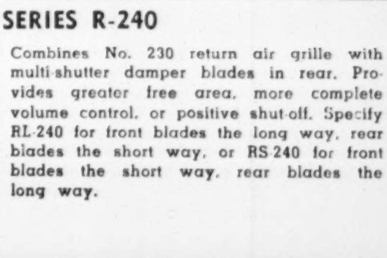
SERIES No. R-21

Superior quality. Close spacing for finer appearance. Blades on 3/8" centers. Deep fins have easy curved deflection. Standardized at 0 or 45 degrees. Greater free area — more strength. Specify RL-21 for blades parallel the long way; RS-21 for blades parallel the short way.



R-22

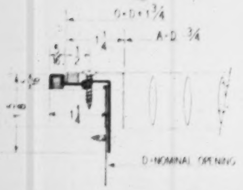
Consisting of the No. 21 return air grille plus multi-shutter damper blades in rear. Rear multi-shutter damper blades are 1-3/8" deep spaced on 1" centers. Available as RL-22 with front blades the long way, rear blades the short way; or RS-22 front blades the short way, rear blades the long way.



SERIES R-240

Combines No. 230 return air grille with multi-shutter damper blades in rear. Provides greater free area, more complete volume control, or positive shut-off. Specify RL-240 for front blades the long way, rear blades the short way, or RS-240 for front blades the short way, rear blades the long way.

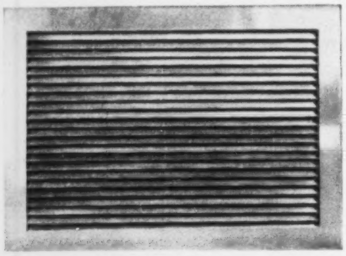
Airfoil AIR CONDITIONING OUTLETS



FRAME 115

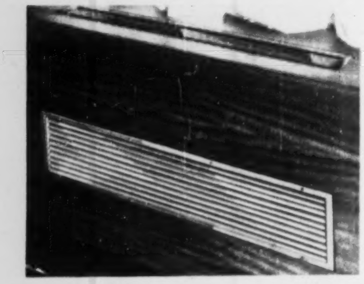
FOR ALL AIRFOIL GRILLES AND REGISTERS

Allows quick easy removal for cleaning or adjusting. Can be installed either before or after plastering has been completed. Frame may be imbedded in plaster. Each frame has sponge rubber gasket to prevent air leakage. Edge acts as plaster lock. Designed for use with Titus Airfoil registers and grilles only.



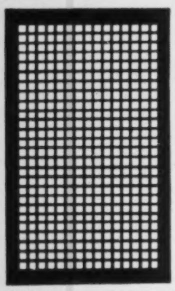
SERIES T-700 AUXILIARY FRAME

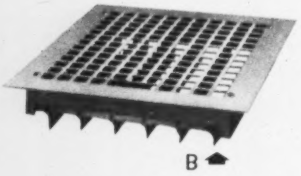
No-Vision door and partition grilles. Made of strong, all steel construction. V shaped louvers on 1/2" centers set securely in end frames. No rattle when doors are slammed. Attractive in appearance. Widely used for exhaust and return air grilles. There is maximum free area, yet the grilles are completely sight-proof. Available in Style A having channel frame for use with quarter-round, or Style B, having flanged frame on one side. Auxiliary frame as shown far left is available with Style B.



CONVECTOR GRILLES

These are custom designed grilles available at standard prices. Made to withstand heaviest use and abuse which lower wall grilles must take. Tamper proof, extra-heavy support bars — over 70% free area. Available in four styles, C2100 and C2300 grilles and C2200 and C2400 registers. Write for complete catalog information on this line of grilles custom designed for use with convectors.



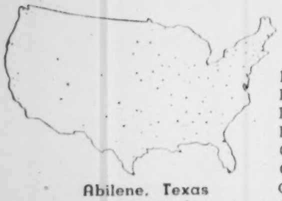


A. PERFORATED GRILLES

Titus perforated grilles are made to order in all standard lattice, 1/2", 5/8", 3/4", and 7/8", in 10, 12, 14, or 16 gauge steel. Also available in aluminum or stainless steel. Quotations furnished promptly upon application.

B. STAMPED STEEL WALL REGISTERS

Titus stamped steel wall registers feature multiple-valve slide center movement. For use in wall or ceiling. Faces 12 gauge steel with 3/4" square perforations and 1/4" crossbars.



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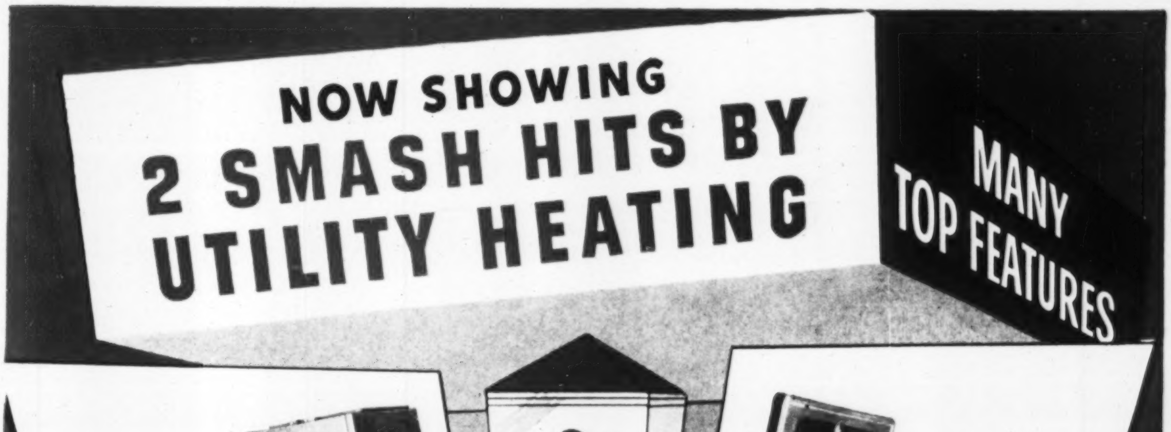
TITUS MANUFACTURING CORP. . . . . . WATERLOO, IOWA



Hurry hurry hurry—see the sensation of the forced air furnace field! Utility's 70FA Forced Air Furnace is breaking sales and popularity records all over the lot. That's because its 70,000 BTU input gives large home heating at small home cost. Yes, its performance is so high and its price is so low that home owners everywhere are buying Utility. Stock it today and watch your box office profits skyrocket! Super-quiet Dy-Rekt* drive blower assembly . . . Sy-Lent* Heat Exchanger . . . approved for zero clearance...easy to install, can be spotted in only 14" x 25½" floor space (in closets, alcoves, etc.) . . . AGA approved.

*Pat. Pending

Second big hit is Utility's 50RD Recessed Dual Wall Heater. It pulls in the customers because it's amazingly low in price . . . does a double-feature heating job and delivers the air at living level where it really does some good. Prospects love its cool-to-touch Fiberglas insulated panel. And it has fully automatic controls . . . fits between standard 16" center studs . . . 50,000 BTU input. Utility's 50RD Recessed Dual Wall Heater is 60" high, and the front panel is 17" wide . . . and the unit is as handsome as a matinee idol! Stock Utility's 50RD now . . . you'll have a real crowd-pleaser on your Utility Heating Equipment show!

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For *Steam* Heating, too,
it's Sarcotherm!

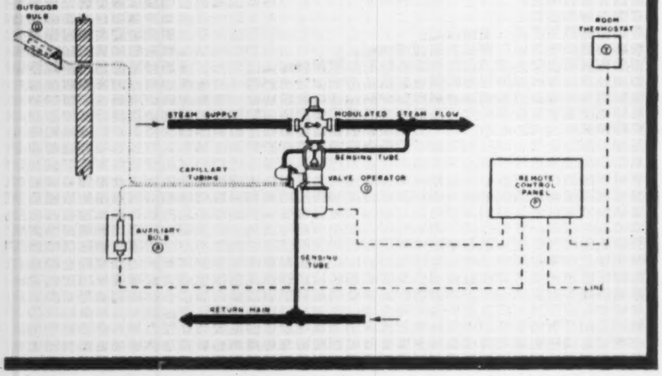
Effective control of steam heating systems for single or multiple buildings is best accomplished by continuously modulated flow of steam, proportioned automatically by outdoor temperature.

The carefully engineered SARCOSTAT SYSTEM shown diagramatically in Fig. 1 fulfills these requirements perfectly. Many are now in successful operation.

The heart of the system is the Sarcostat hydraulic-electric control valve (Fig. 1) installed in the main steam supply line to each zone and positioned by the combined effect of the outdoor temperature and the influence of steam pressure existing on the downstream side of the valve.

Successful operation is predicated on careful sizing of orifice plates in each radiator or convector, which is part of the engineering service provided by Sarcotherm.

If you are seeking trouble-free heating control of steam systems of any size or type, we shall be glad to place our experience at your disposal without obligation.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①
ROOM THERMOSTAT
Ⓣ
STEAM SUPPLY
MODULATED STEAM FLOW
SENSING TUBE
CAPILLARY TUBING
VALVE OPERATOR
Ⓢ
REMOTE CONTROL PANEL
Ⓟ
AUXILIARY BULB
Ⓐ
SENSING TUBE
LINE
RETURN MAIN

Fig. 1, Typical Hook-up of Sarcostat System.

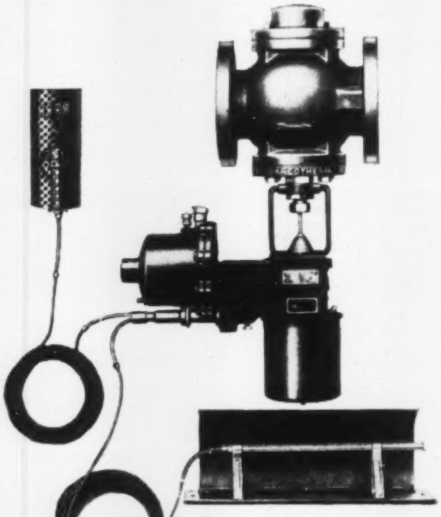

Fig. 2, Sarcostat Modulating Control Valve, Type W-1.

Fig. 3, Type W Manual remote Control Panel is equipped with temperature adjusting knob for "warmer" and "cooler," also a four-position Selector Switch for "Automatic," "Full Heat," "Heat Off," and "Summer."

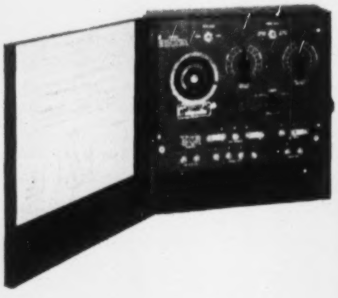

Fig. 4, Type WSA Remote Program Control Panel, adds to the features of type W a time clock to provide automatic morning pickup and night setback, and other features as specified.

Sarcotherm
2

Write for NEW Catalog ***ST500-2***

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A SARCO PRODUCT

CHIEF ENGINEER tells *why*

"we won't accept substitutes"

NORTHERN HOTEL, Billings, Montana, exclusively equipped with Sarco radiator traps, inlet valves and other heating specialties.

Heating contractor, Christensen Plumbing and Heating Co. of Billings, secured the Sarco specialties thru Crane Co.

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"...For thirty-one years, we have been using Sarco type H radiator traps, radiator valves, float-thermostatic steam traps, etc., in the Northern Hotel, which now has 300 rooms.

Over 1,281 Sarco type H radiator traps have been in service since the hotel was rebuilt in 1941.

During the ten years to date, we have replaced not more than a half-dozen elements.

That's why we again ordered Sarco heating specialties for the 1951 addition of sixty-three rooms. We won't accept substitutes.

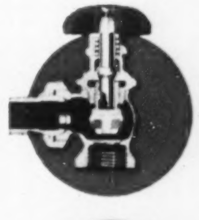
WILLIAM HILLNER
Chief Engineer"

EVERY DAY, more engineers, architects and owners specify Sarco Heating Specialties because:

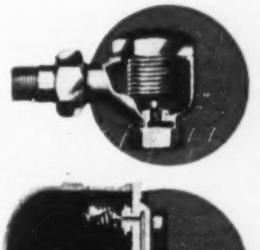
1. they are nationally known and preferred.
2. they have earned a reputation for giving years of trouble-free service.
3. the line is complete.

If you want silent, efficient and trouble-free service over a long period of years, specify SARCO.

Write for Catalog 150-6, 350-5 and 450-9.



Sarco Radiator Valve No. 1141.



Sarco Radiator Trap, type H. Made with the famous Sarco Bellows; seamless, heavy wall, helically corrugated.

Sarco Float-Thermostatic Trap.

SARCO saves steam
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You don't get those valve "kick-ups" that cause production delays and figure mighty costly over a given period.

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There are no complicated inside works in the "1000" valve. As a matter of fact, there is only the one vital moving part — the seat piston. There are no restricted passages—no small ports — no aggregation of close fits.

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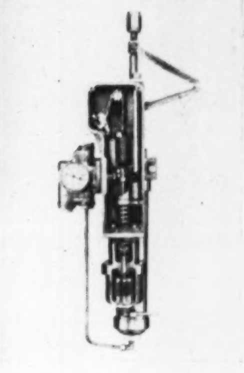
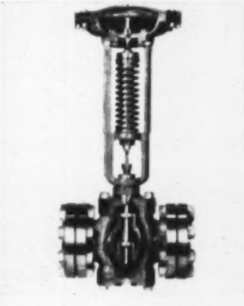


Bulletin 963 features the CASH STANDARD Type 100 Series of Super-Sensitive Controllers — various types for automatically operating valves, dampers, rheostats, stokers, pulverizers, fans, and other apparatus. 16 pages filled with descriptions and applications.



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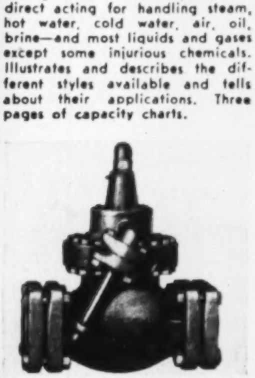

Bulletin 956 features the CASH STANDARD Type 4030 Back Pressure Valve — designed to automatically maintain a constant pressure in the evaporator corresponding to a constant temperature desired. Shows an Ammonia and Freon Gas Capacity Chart based on ABSOLUTE pressures.

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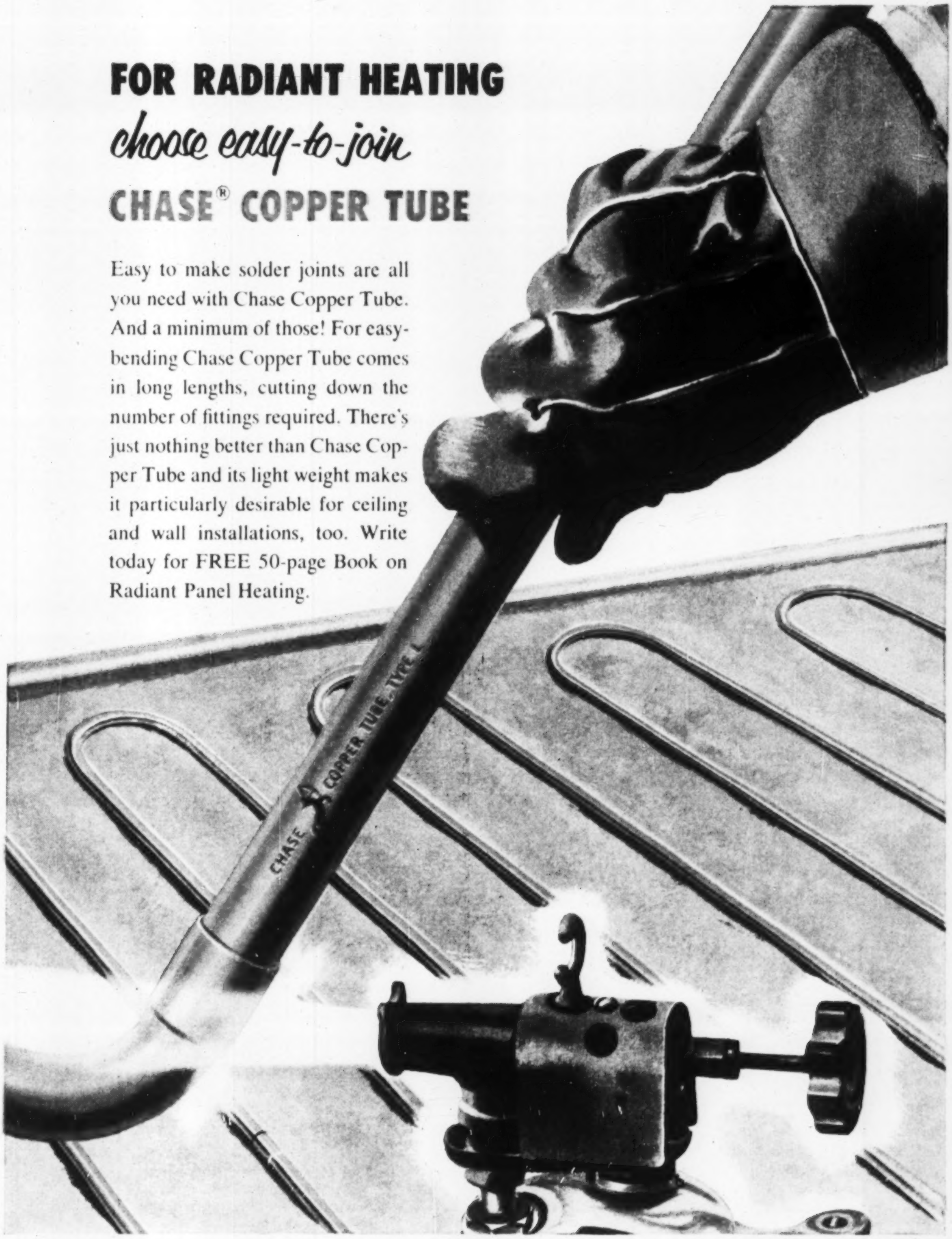

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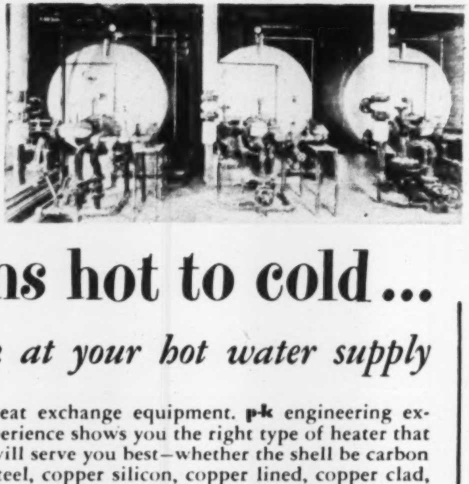

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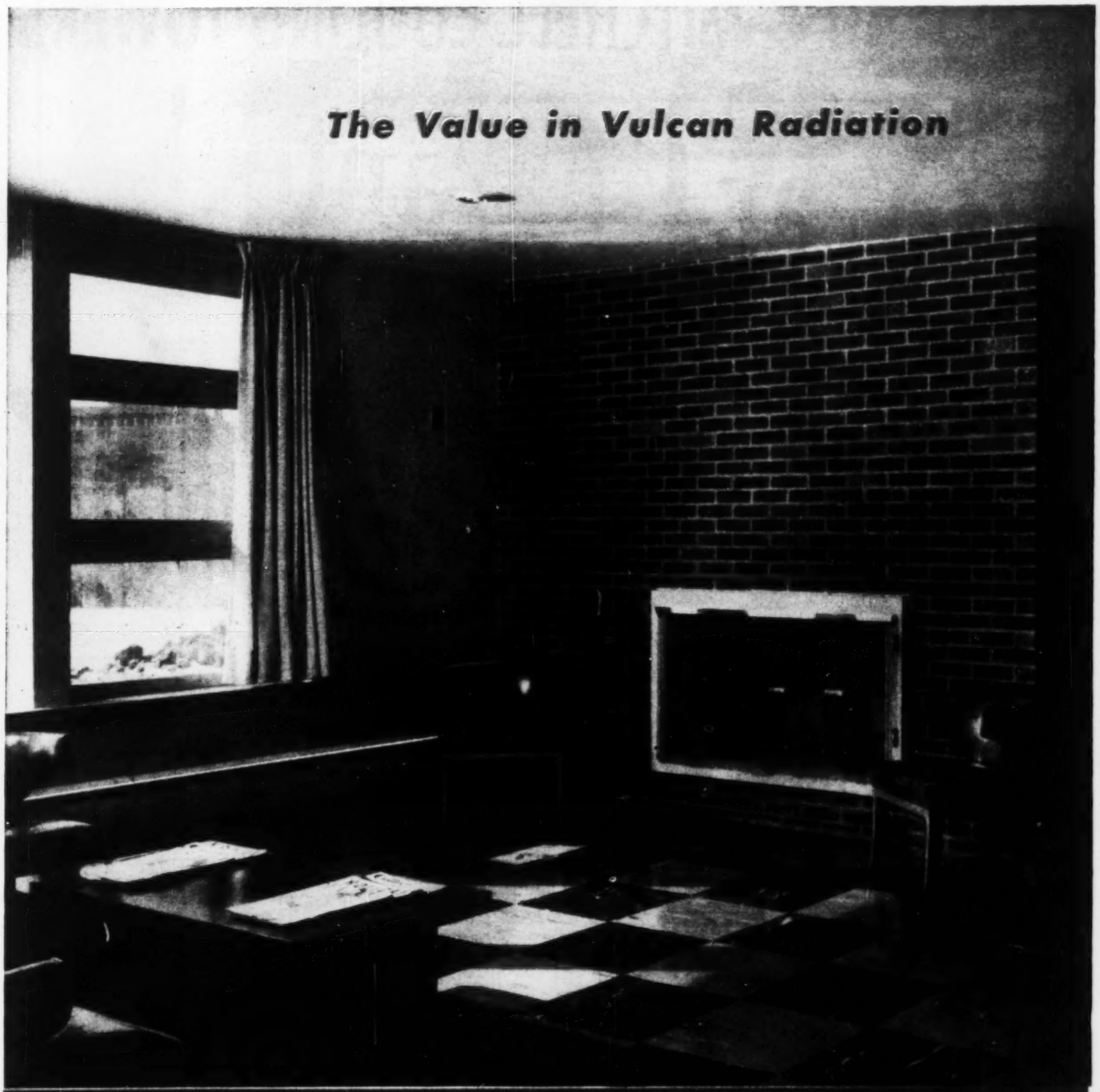

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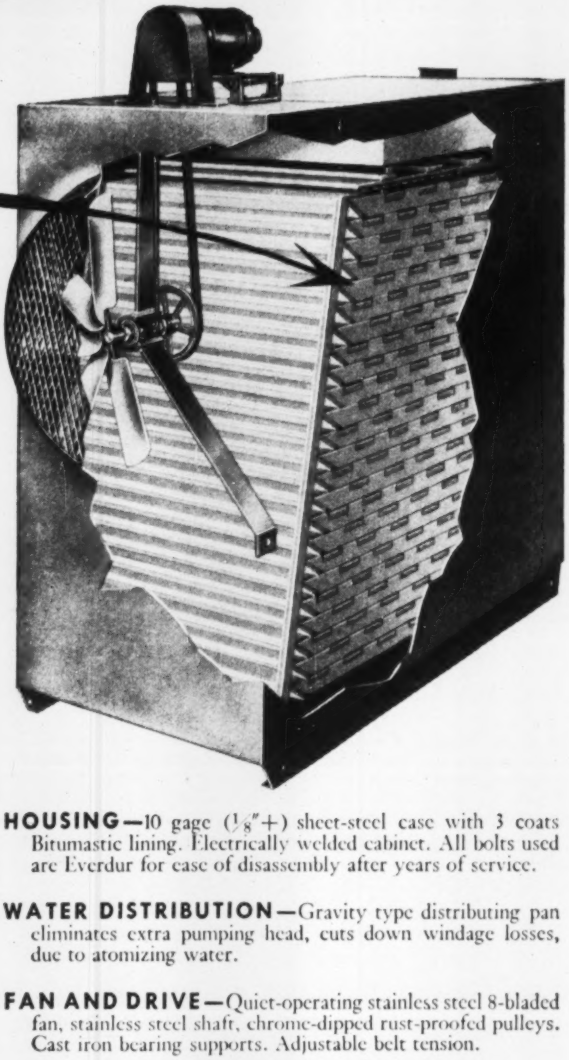
20-Year Guarantee!

On the Wetted Deck Surface of Koppers Pressure-Treated Wood



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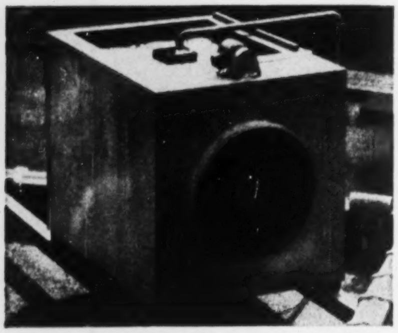

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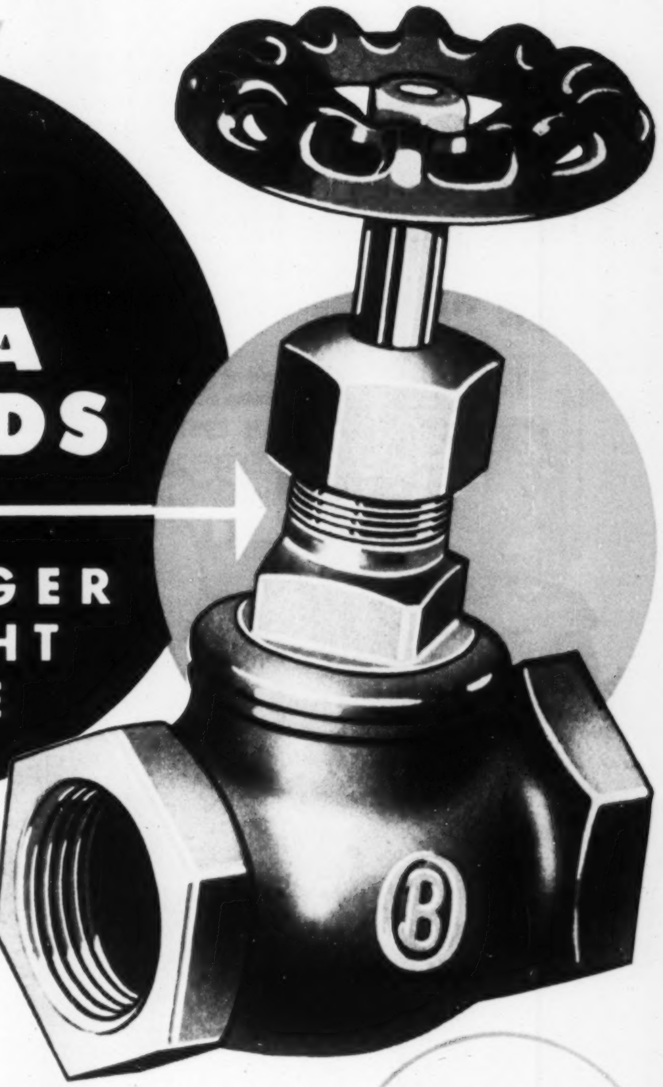

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With composition disc. Also available in angle type or with solder type ends ¼" to 2" in size.

Leaky valves are bound to make home-owners unhappy. Why not protect your customers against this common source of trouble by insisting that Ohio Brass valves be installed on hot and cold water lines?

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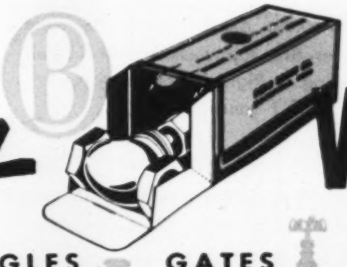
On your next job be sure to specify Ohio Brass valves. Your local distributor carries them in a complete line of low pressure globes, gates, angles and checks. He will be glad to provide you with valves or any of your other plumbing and heating needs.

4207-V



Ohio Brass VALVES

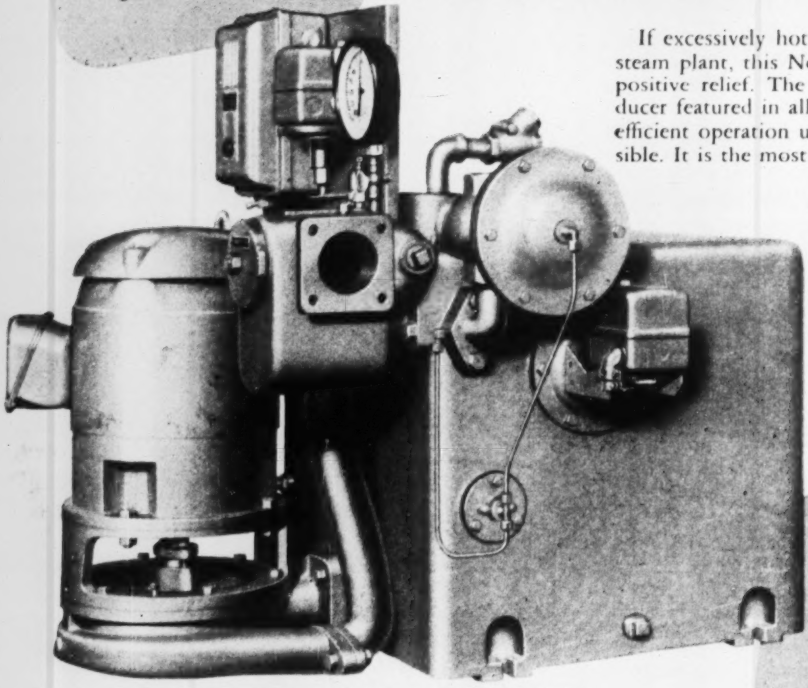
BRONZE GLOBES ANGLES GATES AND CHECKS

NEW!

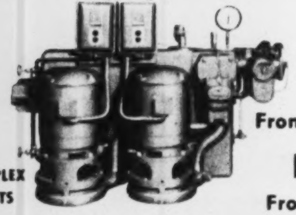
VERTICAL MOTOR HIGH ABOVE DIRT AND WATER

HOFFMAN VACUUM PUMPS

If excessively hot condensate is a problem in your steam plant, this New Hoffman Vacuum Pump offers positive relief. The exclusive Jet-Type Vacuum Producer featured in all Hoffman Vacuum Pumps assures efficient operation under conditions ordinarily impossible. It is the most effective means known for simultaneously removing air and water from the system. Years of service cause no deterioration, as the Hoffman Jet has no moving parts to wear or score. As a result, *the Hoffman Vacuum Pump will handle hotter water than other types of pumping units.*



TYPES "VS" and "VSS" SINGLE UNITS



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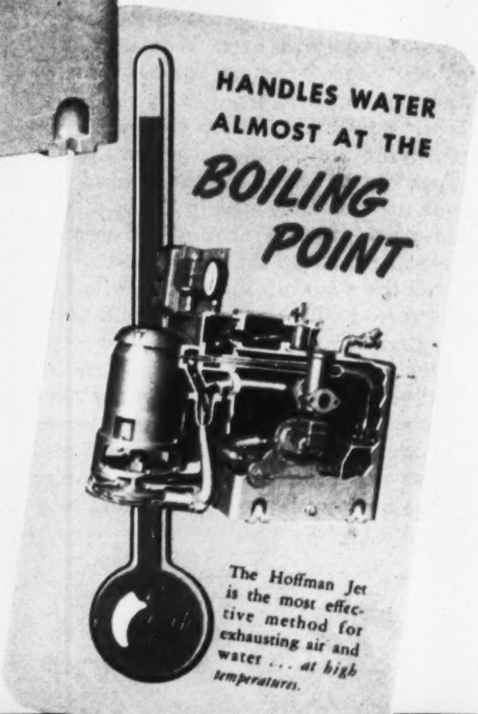
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The Hoffman Jet is the most effective method for exhausting air and water ... at high temperatures.

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- for complete systems
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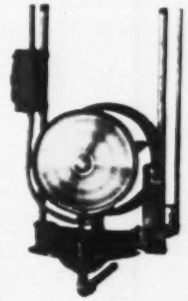
Here's a self-contained, automatically controlled humidifier that offers unusual advantages for industrial and commercial applications. Quickly installed—no ducts, pumps, compressed air, steam, drain or floor space required. Uses city or well water at usual temperatures and pressures. Evaporative capacity up to 3 gph with ¼ hp motor, 1½ gph with ⅛ hp.



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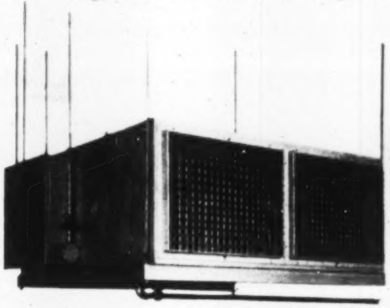
The most widely used self-contained humidifiers ever developed, Centrifugal Humidifiers combine high capacity with low initial cost and low operating cost. Automatically controlled, units centrifugally atomize ordinary city or well water and diffuse it with room air for almost instant evaporation. Type H evaporates up to 8 gph and Type L up to 12 gph with fractional hp motors.



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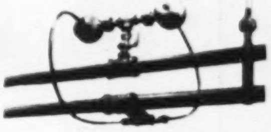

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General Contractor: Bryant & Detwiler Co.
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18 Marlo MULTI-ZONE AIR CONDITIONING UNITS WILL PROTECT DELICATE EQUIPMENT ...KEEP WORKERS COMFORTABLE

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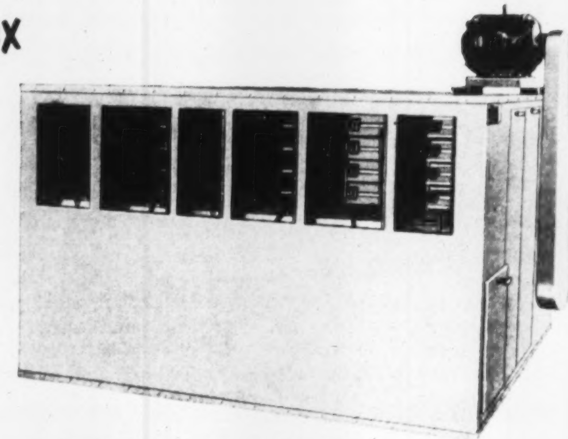
The complex and exacting air conditioning requirements in the new Michigan Bell Telephone Company annex in Detroit will be met by 18 dependable MARLO Multi-Zone Units—each capable of performing six different air conditioning functions *at the same time.*

MARLO equipment can solve *your* air conditioning problems, too. Ask your architect or engineer, or write Marlo for complete information.



MARLO MULTI-ZONE UNITS
meet exacting air conditioning needs.

See Marlo Equipment at Space No. 1001, 1002, 1101—International Heating & Ventilating Exposition, Chicago, January 26-30, 1953

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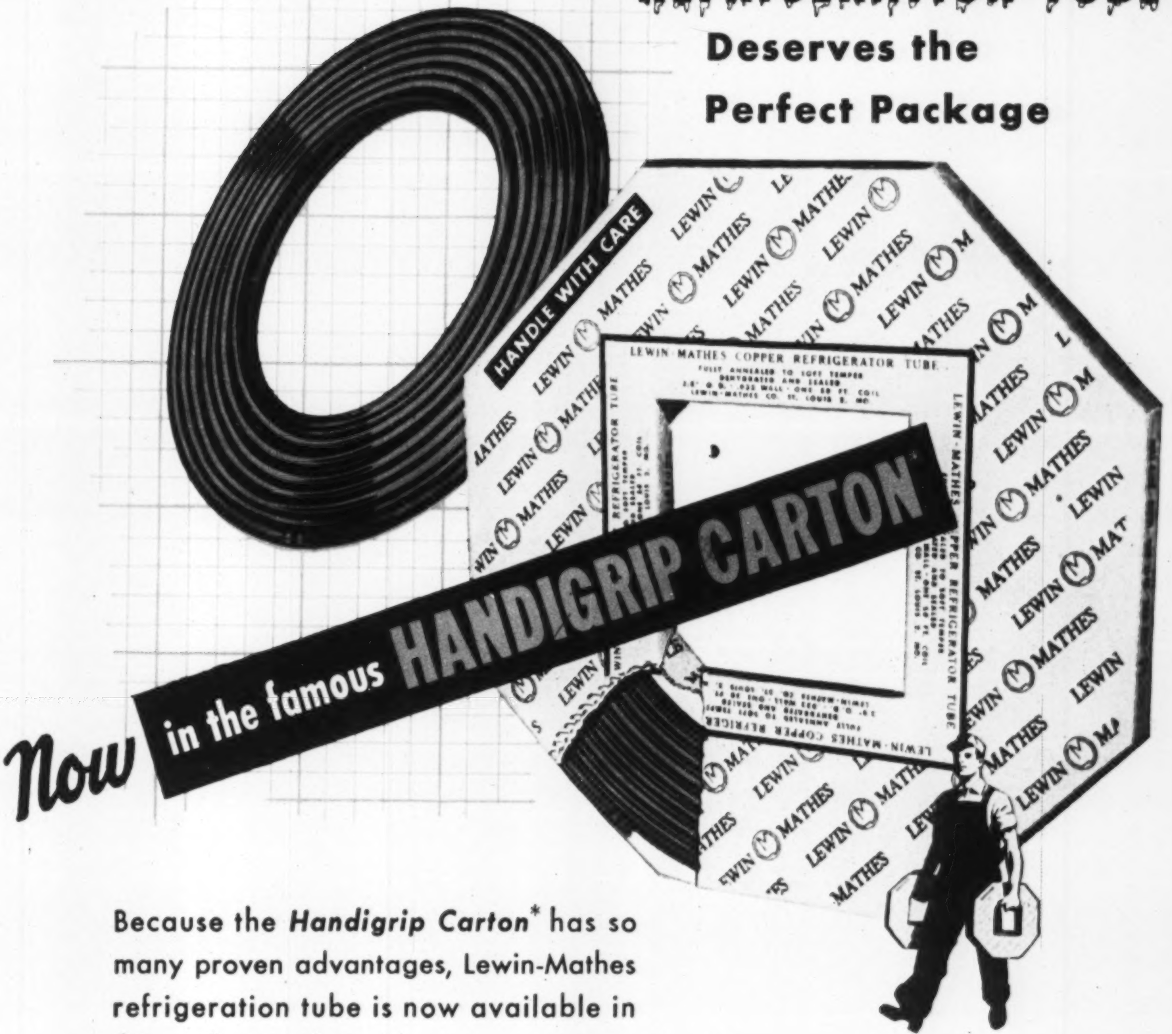
The Perfect REFRIGERATION TUBE Deserves the Perfect Package


Now in the famous HANDIGRIP CARTON
HANDLE WITH CARE
LEWIN-MATHES COPPER REFRIGERATOR TUBE
LEWIN MATHES

Because the *Handigrip Carton** has so many proven advantages, Lewin-Mathes refrigeration tube is now available in this perfect package.

- INDIVIDUALLY PACKED
- SAFE PROTECTION FOR RESHIPMENT
- EASY TO HANDLE
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Only Lewin-Mathes copper tube is packed in the Handigrip Carton*

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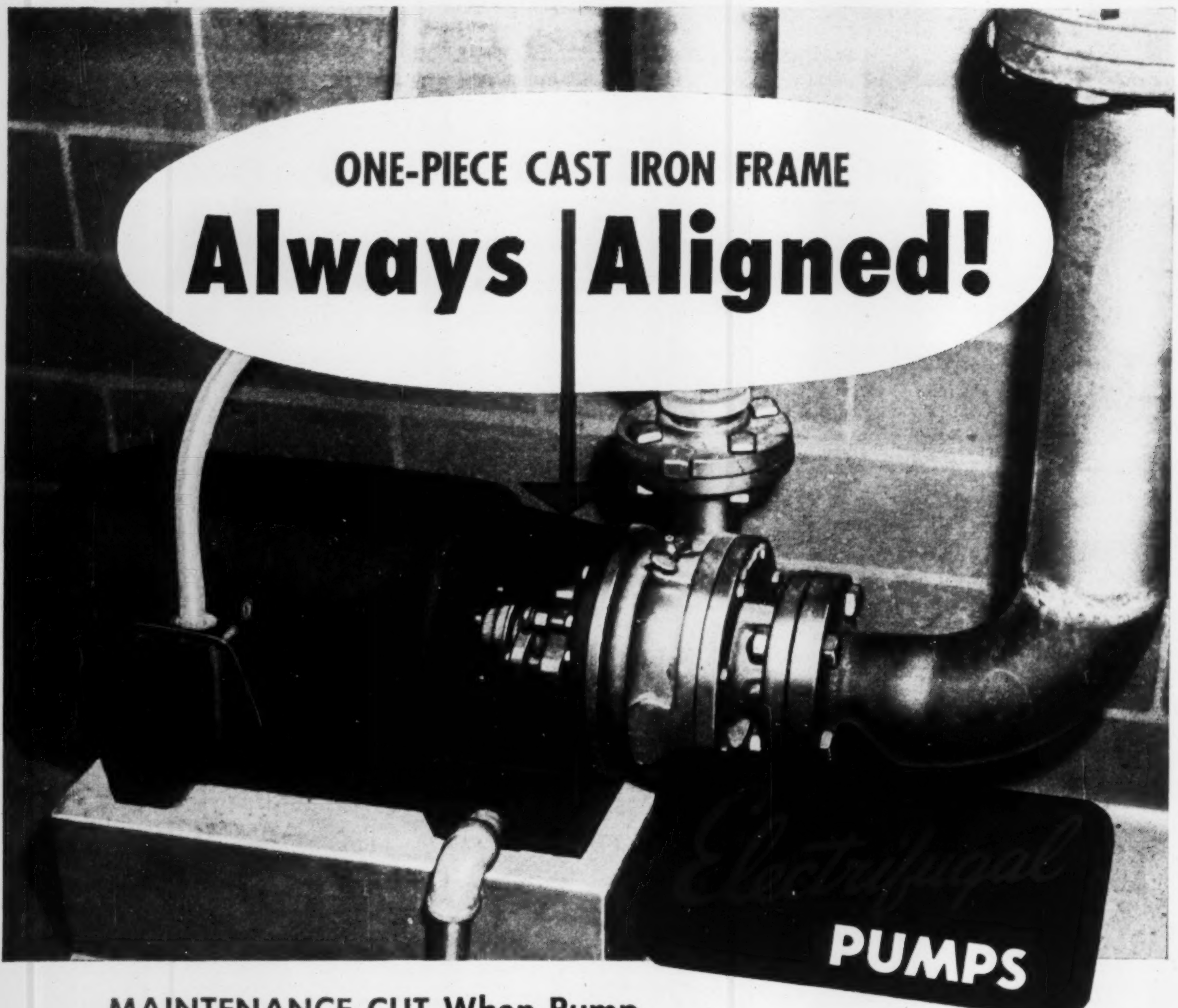

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ELIMINATE TROUBLES caused by misalignment . . . excessive wear of bearings, packing, and couplings. For lower maintenance, standardize on Allis-Chalmers package pumps . . . the pump with permanent alignment built in.

The complete pumping unit comes to you in one piece. Simply bolt it to the floor, connect power and piping, and you're ready to pump. No special foundation, no couplings or extra parts required.

Both motor and pump are designed together . . . built together by Allis-Chalmers. And there's a nation-wide chain of Certified Service Shops to back up your installations. Built in sizes from 10 to 500 gpm; heads to 220 ft.

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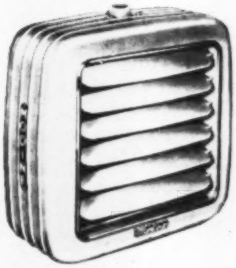
NEW PUMP FILMS

See new series of 3 sound-slide films, widely praised by educational and industrial groups. Get practical, instructive information on theory, application, installation and maintenance of centrifugal pumps. Series is designed for showing to maintenance meetings, plant groups, and engineering societies. Arrange now for a showing! Call your nearby Allis-Chalmers authorized distributor or district office. Or write Allis-Chalmers, Milwaukee 1, Wis.

LOOK TO MODINE

for the finest in modern heating

MODINE UNIT HEATERS FOR STEAM, HOT WATER AND GAS



Horizontal Delivery Type

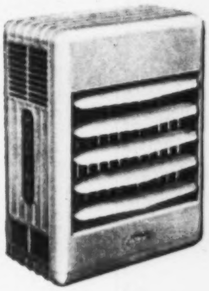
Built for general industrial and commercial applications, the Modine Horizontal Delivery Unit is produced in 23 models. Discharge air temperatures of 110°-120° F are correctly related to air velocities — assuring perfect heating comfort, lower fuel costs.

Vertical Delivery Type

Available in 16 different models designed for high overhead installation — or at low levels. Coordinated with the horizontal and power-throw models, the Modine Vertical Unit Heaters can also be used individually or in combination with the fully integrated line.

Power-Throw Type

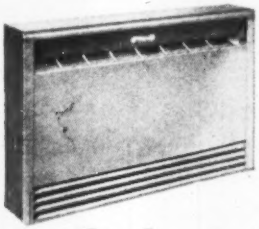
Offers powerful, long-throw air delivery for maximum heat distribution over a wide area. In warehouses and other large buildings, a few Power-Throw models often replace a larger number of standard units with resulting economies in equipment and piping.



Gas-Fired Type

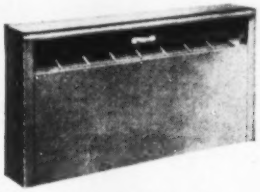
Advanced-design line built in five sizes. Features include corrosion-resistant, stainless steel heat exchanger and burner for durability, new light weight, better heating performance. A. G. A. approved for use with natural, manufactured, mixed, and L. P. gases.

MODINE CONVECTOR RADIATION FOR STEAM OR HOT WATER SYSTEMS



Type F

Ideal for either complete or partial recessing in a wall or for open installation against a wall. Louvered lower grille shown is optional. Built in Institutional type also.

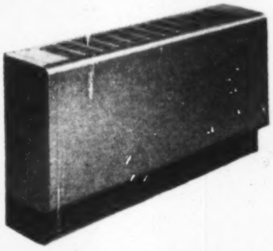


Type W

Hung on the wall, this type is used where frequent cleaning of the floor underneath convector is required. Distinctive lines of Type F are retained. Also offered in Institutional type.

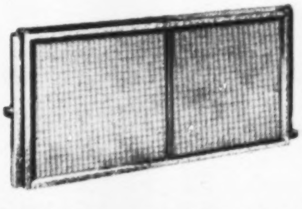
Type S

Wall-hung type, with air outlet grille incorporated in sloping top. Slightly higher heating capacity. Offered in standard enclosure or heavy-duty Institutional models.



MODINE CABINET UNITS

In models from 120 to 640 Edr for floor, wall or ceiling installation. Provides quiet, quick and positive heat distribution, with or without ducts in commercial and public buildings.



MODINE HEATING COILS

More than 1200 high capacity heating coils designed for steam and hot water. Standard and steam distributing types in sizes from ½ to 30½ sq. ft.

Modine

MANUFACTURING COMPANY

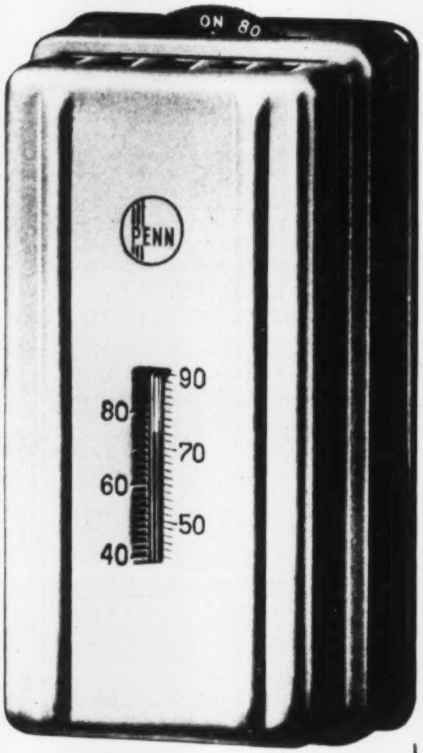
1509 DeKoven Ave., Racine, Wis.

See your phone book classified section for the Modine representative in all principal cities.

UR-1139

3 things happen when your UNIT HEATERS have PENN *individual controls!*

First, you get selective heating for each department or section of a plant depending upon its needs. Once set, the operation is automatic. PENN's famous *heat anticipation* holds temperature closely to the selected level for real heating comfort.



Second, during the heating season, the built-in "ON-OFF" switch featured in the PENN unit heater thermostat is a great fuel saver. A mere rotation of the dial to "OFF" position stops heat flow during idle periods . . . or to little-used areas . . . or to areas where heat can escape such as receiving or shipping rooms which may be exposed to outside temperatures for long periods.

Third, during the summer, this *same* switch permits manual control of unit heater fan for ventilation whenever desired. For continuous fan operation, merely rotate dial to "ON" position.

Learn more about this *better control* for unit heaters. Ask your manufacturer, wholesaler or write **Penn Controls, Inc., Goshen, Indiana.** Export Division: 13 E. 40th Street, New York 16, N. Y., U.S.A. In Canada: Penn Controls Limited, Toronto, Ontario.

DID YOU KNOW . . . In addition to heating controls, PENN has a complete line of refrigeration and air conditioning controls for your specific needs. Included in this line are cooling thermostats, humidistats, water valves, solenoid valves, magnetic starters, temperature and pressure controls, oil protection controls for pressure-lubricated refrigeration compressors and many others. Bring your control problems to PENN . . . you'll get the correct solution.

PENN
AUTOMATIC CONTROLS

FOR HEATING, REFRIGERATION, AIR CONDITIONING, GAS APPLIANCES, PUMPS, AIR COMPRESSORS, ENGINES

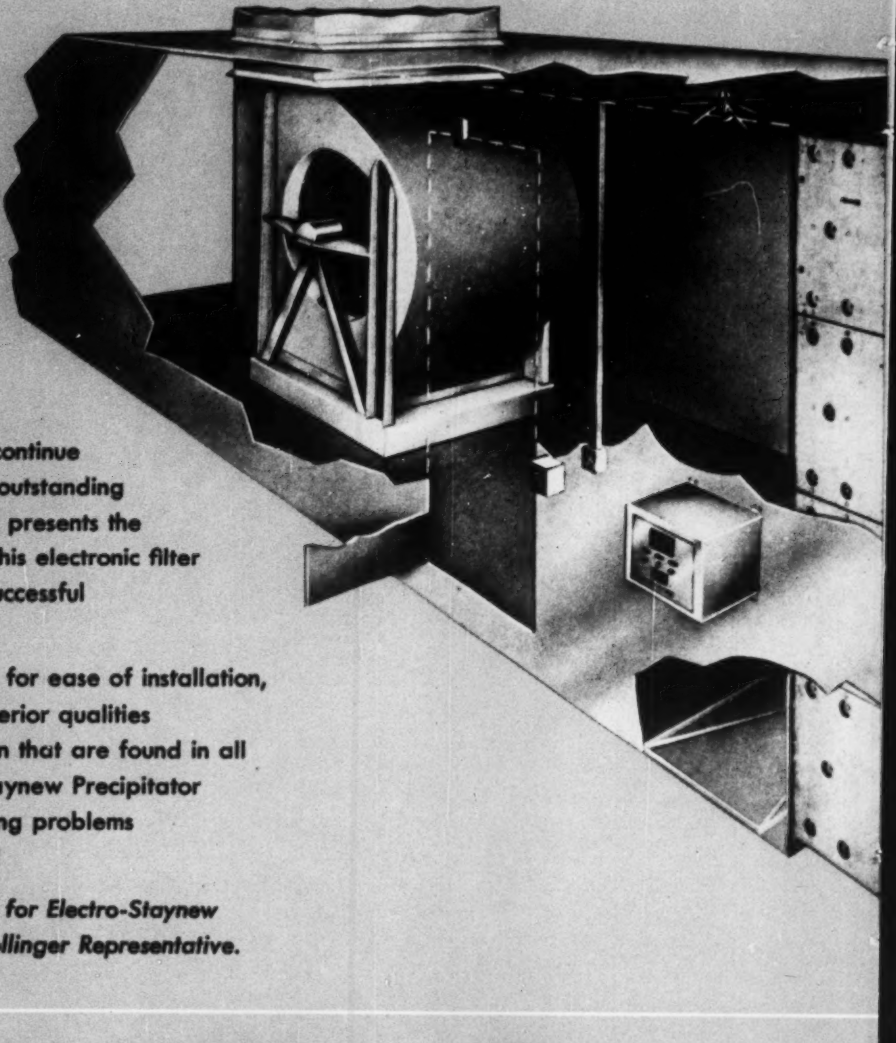
ANNOUNCING
THE DOLLINGER
Electro-STAYNEW
PRECIPITATOR

Electro-STAYNEW

Engineered and Manufactured by

DOLLINGER CORPORATION, Rochester 3, New York

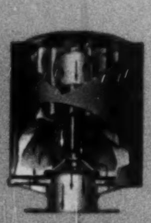
NOW! WE'VE ADDED THIS NEW COMPLETE LINE OF STAYNEW



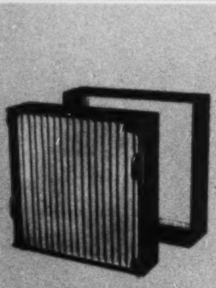
The Dollinger Corporation, to continue its policy of manufacturing an outstanding filter for every industrial need, presents the Electro-Staynew Precipitator. This electronic filter is a completely tried, tested, successful unit . . . *not* a new invention.

It features *one-unit* construction for ease of installation, and incorporates the same superior qualities necessary for precision filtration that are found in all Staynew Filters. The Electro-Staynew Precipitator is the answer to many ventilating problems . . . perhaps it can solve yours!

For complete details write today for Electro-Staynew Bulletin 400, or contact your Dollinger Representative.



Model D
Intake Filter



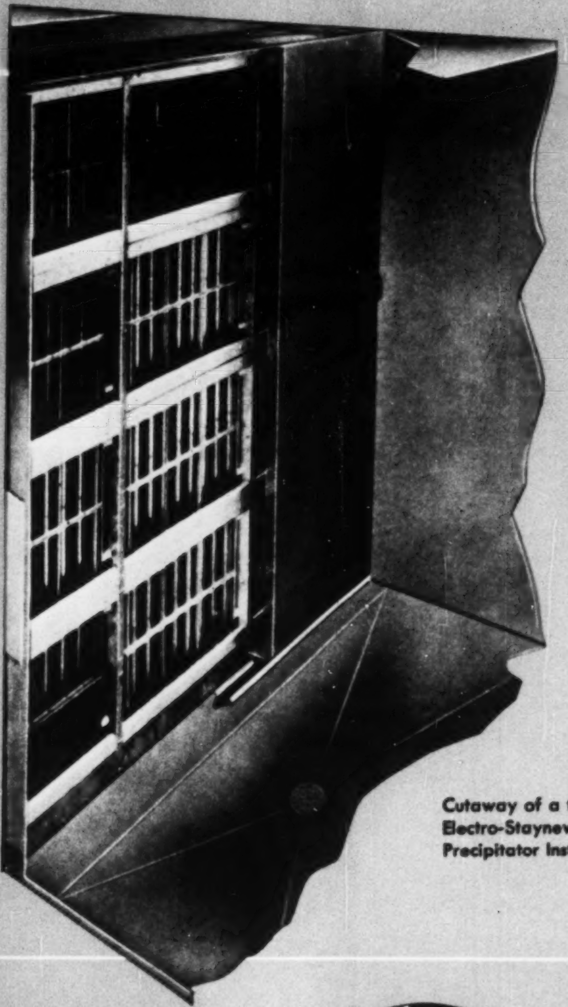
Model WKE
Dry Panel Filter

Automatic Self
Cleaning Type Filter

Model CPH
Pipeline Filter

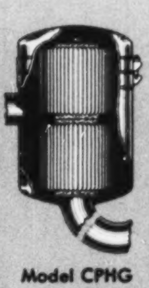
Model HE
Hydraulic Filter

PRECIPITATOR TO THE FILTERS!

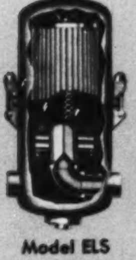


Cutaway of a typical Electro-Staynew Precipitator Installation.

Model DPV
Viscous Panel Filter



Model CPHG
Gas Filter



Model ELS
Liquid Filter

TYPICAL INDUSTRIAL PRECIPITATOR APPLICATIONS

APPLICATION	ADVANTAGES
Art Galleries Libraries Radio Studios	Dust deterioration eliminated—valuable books, paintings, records and files protected.
Banks Offices Public Buildings	Cleaner, more healthy working conditions possible. Painting, cleaning and redecorating costs reduced.
Breweries	Close control of yeast germination realized. Foreign spores and bacteria-carrying particles eliminated, permitting a finished product without spoilage.
Chemical Plants	Highly refined chemical processes completed without contamination.
Department Stores	Merchandise remains clean and attractive. Time previously consumed by employees in dusting stock can be spent more profitably on sales. Greater profits obtainable as merchandise remains salable longer.
Food and Meat Processing	Food can be prepared and packaged without dust contamination.
Food Stores	Sanitary conditions assured. Nuisance dusts eliminated. Stocks and displays attractive and clean.
Restaurants Night Clubs Theatres Hotels	Greater patronage with offensive smoke haze eliminated. Sustained redecorating costs greatly decreased. Decorations, furnishings and walls remain clean and bright.
Schools Colleges Churches Auditoriums	Rids the atmosphere of smokes and air-borne bacteria-laden dust, thereby lessening the hazard of common contagious illnesses.
Steel Mills Aluminum Mills Other Metal Processing Mills	Necessary Ventilating Air provided for machinery and electrical apparatus. Clean air for rotating machines and to blast furnaces.
Drug and Pharmaceutical Manufacturing	Pure products assured with a germ-free atmosphere.
Hospitals Clinics Laboratories	Clean pure ventilation of operating rooms, sick rooms, and wards assured. Relief for patients susceptible to air-borne pollens and dusts.
Plants Manufacturing: Automobiles, Aircraft, Engines, Optical Goods, Photographic Film, Plastics, Electronic Products, Precision Instruments, etc.	Elimination of abrasive dusts dangerous to both worker and product. Monetary gains permitted with fewer rejects. Precision surfaces finished without impairment from dust particles. Improved painting operations. Greater operating efficiency.
Photo and Movie Studios	Film, developing solutions, cameras and other expensive equipment protected from harmful dirt and dust.
Power Plants, Substations, Telephone Exchanges, Radio Transmitting Stations	Relays and switch gear equipment permitted to operate without costly interruption. Necessary ventilating air provided for vital electrical machinery.
Testing Laboratories	Precision equipment protected. Exacting tests can be performed in a clean atmosphere.
Textile Mills	Each manufacturing stage protected, thereby permitting a high quality finished fabric. Eliminate costly rejects and waste due to soilage.

BRING YOUR FILTRATION
PROBLEMS TO EXPERIENCED
DOLLINGER ENGINEERS

The Dollinger Corporation serves all industry with filters for any specific requirement. You can choose from our complete line of mechanical filters for air, liquids and gases. We can supply the Electro-Staynew Precipitator for removal of 90%* or more of all air-borne dirt in industrial and commercial air conditioning systems. And . . .
this outstanding Staynew Filter Line is backed by complete engineering, design and laboratory facilities for developing special filters for any application.
This service is available upon request without cost or obligation.

*BUREAU OF STANDARDS Discoloration Test Method

NATION WIDE SERVICE ORGANIZATION

CITIES IN WHICH DOLLINGER CORPORATION IS REPRESENTED

Albuquerque, New Mexico
Atlanta, Georgia
Baltimore, Maryland
Bangor, Maine
Birmingham, Alabama
Boise, Idaho
Boston, Massachusetts
Buffalo, New York
Charleston, West Virginia
Chicago, Illinois
Cincinnati, Ohio
Cleveland, Ohio
Corpus Christi, Texas
Dallas, Texas
Denver, Colorado
Detroit, Michigan
Fort Wayne, Indiana
Fort Worth, Texas
Greenville, S. C.
Hartford, Connecticut
Houston, Texas
Indianapolis, Indiana
Iron Mountain, Michigan
Kansas City, Missouri
Little Rock, Arkansas
Los Angeles, California
Marshalltown, Iowa
Memphis, Tennessee
Miami, Florida
Milwaukee, Wisconsin
Minneapolis, Minnesota
Mobile, Alabama
Nashville, Tennessee
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Norfolk, Virginia
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Phoenix, Arizona
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Portland, Oregon
Providence, Rhode Island
Richmond, Virginia
Rochester, New York
St. Louis, Missouri
Salt Lake City, Utah
San Francisco, California
Seattle, Washington
Springfield, Massachusetts
Syracuse, New York
Toledo, Ohio
Tulsa, Oklahoma
Washington, D.C.
Wichita, Kansas
Worcester, Massachusetts
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ALSO REPRESENTED IN

Mexico City, Mexico
Montreal, Quebec, Canada
Winnipeg, Manitoba, Canada
Toronto, Ontario, Canada
Vancouver, British Columbia, Canada

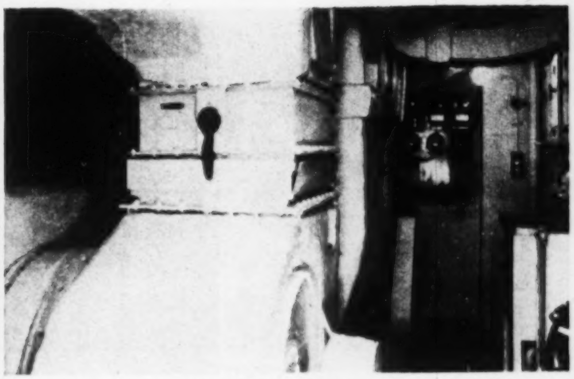
DOLLINGER
STAYNEW FILTERS

DOLLINGER
CORPORATION
56 Centre Pk., Rochester 3, N. Y.

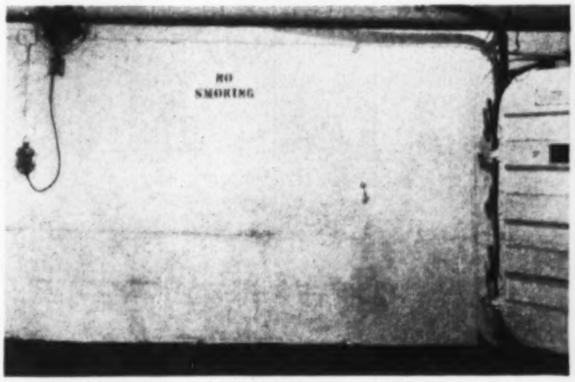
ALL TYPES OF FILTERS FOR EVERY INDUSTRIAL NEED

Litho in U.S.A.

A representative air duct on S. S. United States, with insulation surfaced by Foster Sealfas.



Insulation on fan housing and warm air ducts showing Foster Sealfas protection.



Mess quarters of U.S.S. Arneb, two years after application of Foster Sealfas and Sealfas Lagging Cloth. Severe abuse by sliding tables and benches has not broken surface.

Brush application of Sealfas directly to insulation surface. Sealfas Lagging Cloth or other approved membrane is imbedded into coating and followed by second coat of Sealfas.

Any insulation can take a beating when it has Sealfas* protection

For resistance to rough treatment, in areas of heavy traffic and damage by tools and ladders, the Foster Sealfas* system of industrial insulation surfacing is ideal. Easily applied, white and washable for cleanliness, fire-retardant Sealfas in conjunction with Sealfas Lagging Cloth can withstand puncture and other abuse to an average bursting pressure of 450 pounds per square inch.†

Foster Sealfas has been specified as the surfacing for duct, pipe, and bulkhead insulation in the heavily-traveled crew spaces of U. S. Military Sea Transport Ships; Sealfas was used on insulation throughout the air conditioning duct system of the new superliner United States. Sealfas can give its rugged protection to the insulation on your next project requiring maximum resistance to mechanical abuse *regardless of the insulating materials used.*

Pipe lines, ducts, vessels, equipment—anything requiring thermal insulation and subjected to extraordinary surface abuse—will be protected more efficiently, more economically with Sealfas and Sealfas Lagging Cloth than with uncertain, halfway surfacing measures. Of course Sealfas works well with other membranes, too (such as 8-ounce canvas).

Write for Index to Foster Specifications

*T.M. Reg. U.S. Pat. Off. Benjamin Foster Company.
†Tests conducted on Mullen Tester. Details on request.

© 1952 Benjamin Foster Company

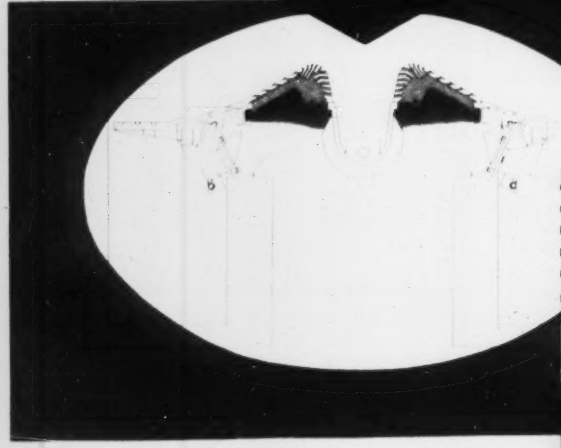
BENJAMIN FOSTER COMPANY • PHILADELPHIA 31, PA.

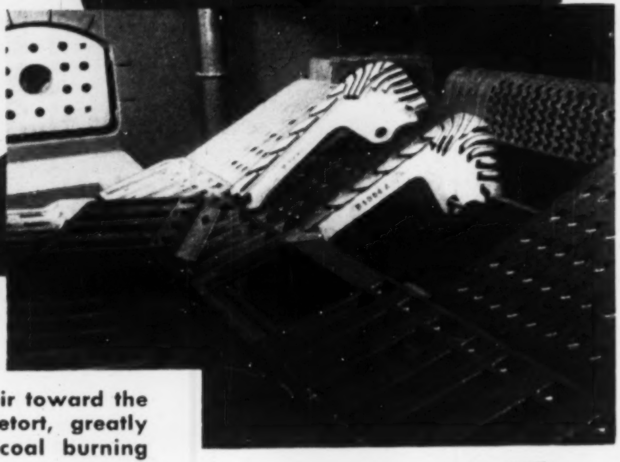
Makers of LAGFAS • SEALFAS • FIRE-RETARDANT MASTICS • TRI-GUARD COATINGS • ADHESIVES, SEALERS, AND SURFACE COATINGS FOR INSULATION AND INDUSTRIAL USES

IT'S NEW!

HI-TUYERE

AN IMPROVEMENT FOR DETROIT UNISTOKERS (OLD OR NEW)





MORE AIR Supplies more air toward the center of the retort, greatly increasing the coal burning capacity.

REDUCED COKING TENDENCY This results in more uniform porosity of the fuel bed.

INCREASED EFFICIENCY Provides better air penetration of the fuel.

LONGER LIFE Increased cooling area due to greater depth of tuyere.

Hi-Tuyere is available in complete sets for your stoker, and is standard design for all new UniStokers. Quotation on request, or mail your order direct to our works.

DETROIT
SINCE 1898
STOKERS

DETROIT STOKER COMPANY
GENERAL MOTORS BUILDING, DETROIT 2, MICHIGAN
Works at Monroe, Michigan • District Offices in Principal Cities

They cost no more . . . So why settle for less!

THE BEST AUTOMATIC AIR VALVES FOR EVERY HOT WATER HEATING JOB ARE LABELED . . .

MAID-O'-MIST AUTO-VENT

NO. 7 AUTO-VENT
Air Eliminators

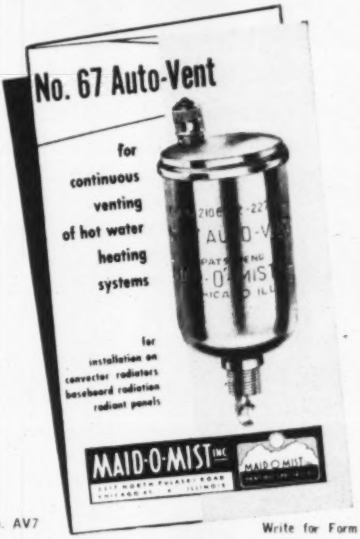
for continuous venting of hot water heating systems

install on mains, pipe lines, unit heaters, convectors, coils

Get that air OUT... *and keep it* OUT!

MAID-O-MIST INC

Write for Form No. AV7



No. 67 Auto-Vent

for continuous venting of hot water heating systems

for installation on convector radiators baseboard radiation radiant panels

MAID-O-MIST INC

Write for Form No. 67

No. 72 Auto-Vent

- THE FASTEST VENTING AIR VALVE (expansion type) FOR HOT WATER HEATING SYSTEMS

Install on
Convector Radiators
Baseboard Radiation
Free Standing Radiators

MAID-O-MIST INC

Write for Form No. 72

The Envelope Stuffers illustrated above are designed for your use. When ordering copies, please give the Form No. as listed under each folder.

MAID-O'-MIST ADAPTER UNITS CONVERT STANDARD TEES INTO BALANCING VALVES

BALANCING VALVE ADAPTER UNITS

NO. 15

NO. 14

MAID-O-MIST

Write for Form No. 1415

Maid-O'-Mist offers you a low cost unit for making up your own balancing valves. They are designed for the job of balancing hot water heating systems . . . easy to install . . . and priced much lower than square head cocks or other types of shut-off valves. These Adapter Units are quickly soldered or sweat fitted into regular copper or bronze tees, or threaded into cast iron tees. Can be inserted in side outlet or run of tee of the same pipe size to complete either a straightway or angle balancing valve. Simple balancing adjustment requires only a screwdriver. Precision made of brass and monel metals with packed stem construction.

FULL FREE FLOW OF WATER THROUGH THE TEE. Since there is no inside reduction of pipe diameter, there is no water restriction except for the balancing required. This advantage plus low cost permits the use of additional balancing in a hot water system without preliminary planning.

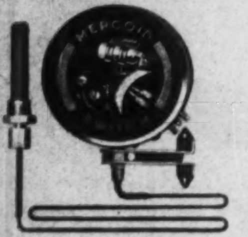
MAID-O'-MIST Inc.
HEATING SPECIALTIES

AUTOMATIC HUMIDIFIERS . . . . . AUTO-VENTS
WATER LINE CONTROLS . HEATING SPECIALTIES
MAID-O'-MIST, Inc.
3217 NORTH PULASKI ROAD . CHICAGO 41, ILL.

MERCOID

AUTOMATIC CONTROLS

TEMPERATURE



—80°F. to 750°F.

PRESSURE

30" Vac. to 2500 P.S.I.

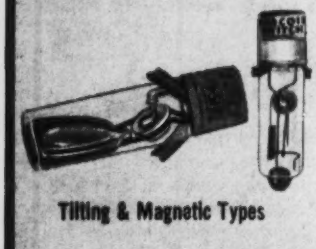
RELAYS

Single & Multiple Circuits

EXPLOSION-PROOF

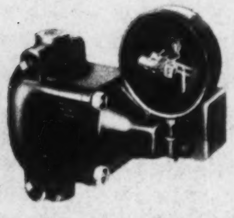
FOR EVERY TYPE OF APPLICATION

MERCURY SWITCHES



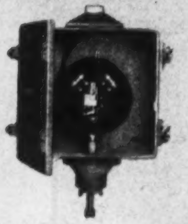
Tilting & Magnetic Types

LIQUID LEVEL

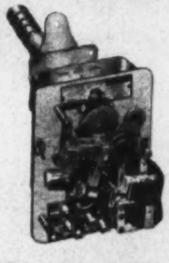


Pressures to 400 lbs.

WEATHER-PROOF



FOR OIL BURNERS



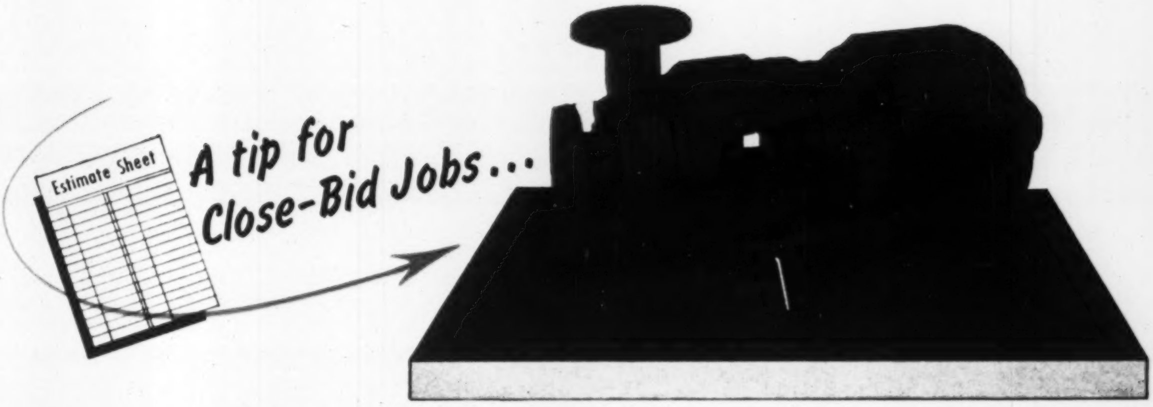
Constant or Intermittent Ignition

If you have a problem involving the automatic control of pressure, temperature, liquid level, mechanical operations, etc., it will pay you to consult Mercoid's engineering staff—always at your service.

For illustrated catalog describing the entire line of Mercoid Controls write for Catalog No. 700A

ALL MERCURY SWITCH EQUIPPED · AUTOMATIC CONTROLS ·

THE MERCOID CORPORATION
4209 BELMONT AVENUE • CHICAGO 41, ILLINOIS
New York: 205 E. 42nd St. • Philadelphia: 3137 N. Broad St.


Estimate Sheet
A tip for Close-Bid Jobs...

I-R MOTORPUMPS PROVIDE THE MARGIN OF PROFIT

A Model RVN Motorpump circulating water on an evaporative cooler for a small office building.

When bidding is close . . . when you've shaved your costs to the bone, there's one sure way of getting the job and making a profit—*specify equipment that does more!*

Here's an example:

Next time a job requires a 2 hp pump, or a 5 hp pump or any other size, install an Ingersoll-Rand Motorpump that gives you a saving in horsepower over ordinary pumps!

Yes, use *smaller* pumps to do bigger jobs! Exhaustive tests prove that, in most cases, a smaller Ingersoll-Rand Motorpump will do the job . . . and you get this same advantage in every size of I-R Motorpump from a ¼ hp to 50 hp!

I-R Motorpumps give you a competitive advantage. It means you can figure to closer margins.

For complete details, call your nearest I-R branch office or write direct.

Ingersoll-Rand MOTORPUMPS for Improved Air Conditioning Operation

A WIDE RANGE OF SIZES AVAILABLE NOW FOR RUSH DELIVERY.

Ingersoll-Rand

11 BROADWAY, NEW YORK 4, N. Y.

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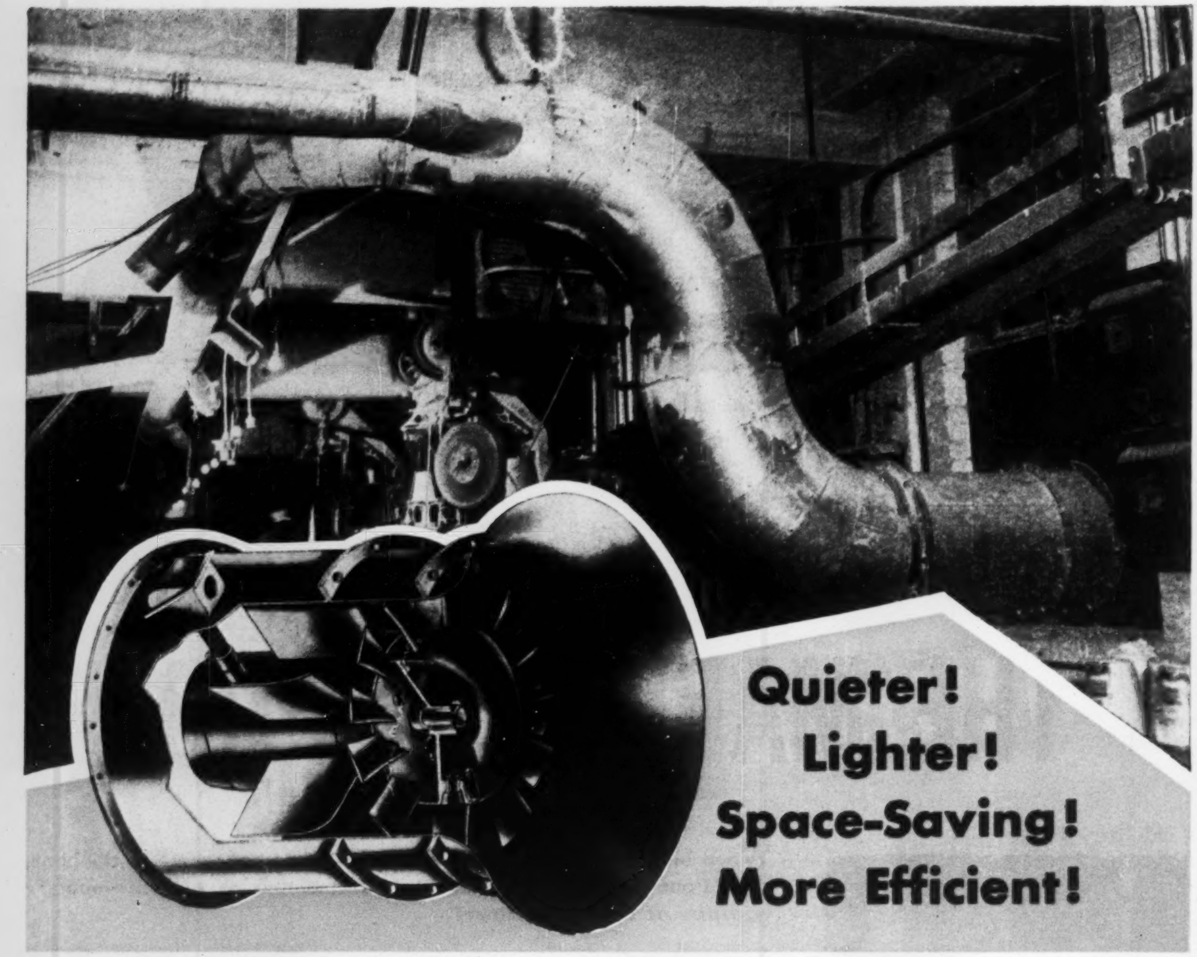


JOY AXIVANE* FANS

(SERIES 1000)

Write for Bulletin, or

Consult a Joy Engineer

The quieter operation, lighter, more compact design, lower power consumption and unmatched efficiency of JOY Axivane Fans are *real* advantages! What's more, their vaneaxial design and in-line construction permit mounting right in the air duct, making installation simple and saving greatly on time and cost. These features, plus the extreme flexibility of operating range made possible by adjustable blades—a standard feature of all JOY Fans—mean better, more dependable and lower-cost ventilation, no matter what your conditions are.

- Let JOY Axivane Fan specialists work with you for best results on your ventilation jobs.

*Reg. U. S. Pat. Off.

W&D 12355

JOY MANUFACTURING COMPANY
GENERAL OFFICES: HENRY W. OLIVER BUILDING · PITTSBURGH 22, PA.
IN CANADA: JOY MANUFACTURING COMPANY (CANADA) LIMITED, GALT, ONTARIO

When you Compare Air Filters . . .

FEEL THE FILTER PACK!

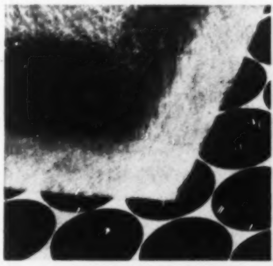
The soft, silky glass fibres are easy on the hands—and really stop Dust! The *magnified* view of the Glasfloss filter pack above shows why the long, fine curly fibres provide efficient filtering action. This fluffy, resilient mass provides an intricate maze of air passages with a greater surface area to catch and hold more dust throughout the entire pack. RESULT: Longer life, less changes, lower cost.

Glasfloss DISPOSABLE AIR FILTERS

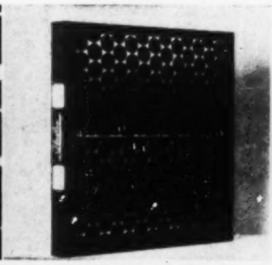
- Hold more dust at higher efficiency
- Less resistance to the passage of air
- Insure greater air capacities
- Easier to handle during installation and removal
- Tough and resilient
- Highly fire resistant
- Moisture-proof

Glasfloss
MAKES A COMPLETE LINE OF DISPOSABLE AIR FILTERS

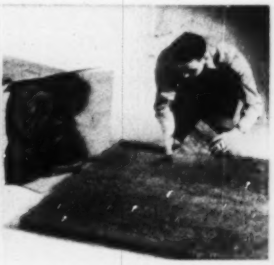
Descriptive literature on request—
Address Dept. HP-1



GLASFLOSS I-S
for heavy industrial use



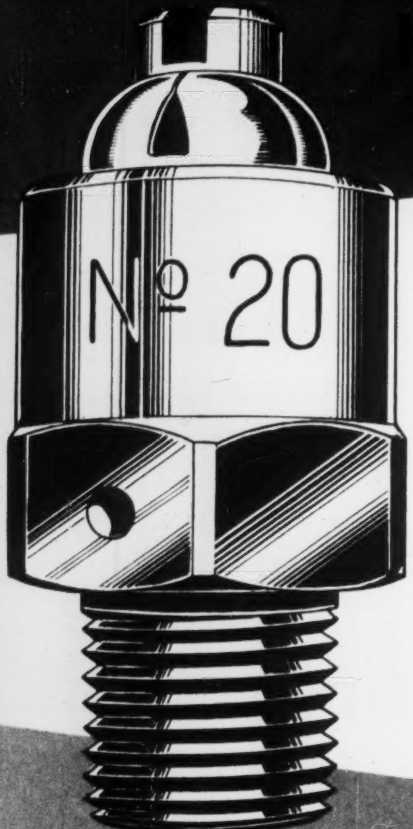
GLASFLOSS STANDARD
the all-purpose filter



GLASFLOSS ROLL-PAK
for economical bulk use

Glasfloss 155 EAST 44th STREET, NEW YORK 17, N. Y.

for the best in hot water heating



use DOLE No. 20

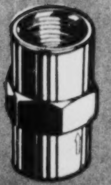
FULLY AUTOMATIC HOT WATER AIR VALVE

The new Dole No. 20 Hot Water Air Valve is the ideal vent for hot water heating on either forced or gravity circulation systems.

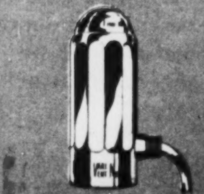
The Dole No. 20 can be easily installed on baseboards, radiators, convectors and high points. It vents the air automatically.

For the latest and finest in hot water air valves, investigate Dole today. Write for details.

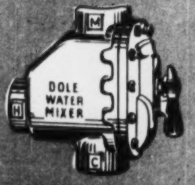
Some Favorites from the Great Dole Line of Controls for Plumbing and Heating



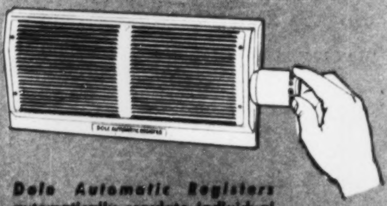
Dole Flow Control Valve gives constant flow regardless of water pressure. Ideal for tankless heaters.



The Dole 1A Vari-vent Valve for instant venting of one-pipe steam heating system. Can be easily adjusted to desired venting speed.



The Dole Water Mixer is installed with tankless heaters and storage tanks for more usable domestic hot water. Reduces scalding danger.



Dole Automatic Registers automatically regulate individual room temperatures for new or existing forced warm air heating systems. Just dial your favorite temperature.

Control with Dole TRADE MARK

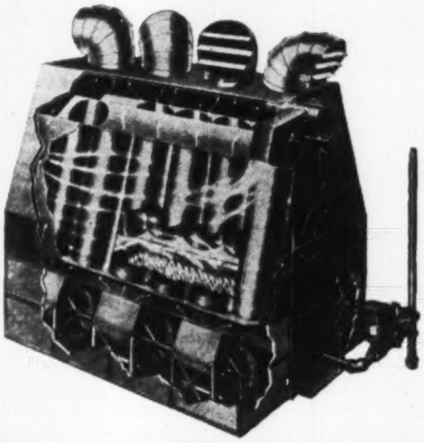
DOLE

THE DOLE VALVE COMPANY
1933 Carroll Ave., Chicago 12, Ill.

Representatives in Principal Cities

for **BIG** Warm Air Jobs...

Campbell Offers these Outstanding Units

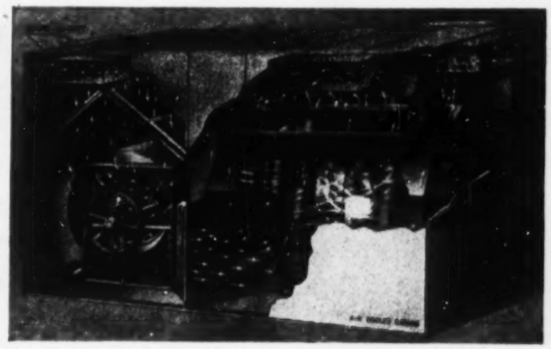


DIRECT-FIRED SPACE HEATERS

Use these Campbell Units for big space-heating jobs. Available for all fuels in capacities up to 2,160,000 BTUs per hour (see table below). These extra heavy welded steel heaters are built to deliver long, dependable service and exceptional fuel economy. Very easily installed.

8000 SERIES HEATERS

These outstanding heaters make it easy and practical to use warm air heat in large multi-room buildings. Outstandingly successful with our PerimetAir distribution system. Large silent blower assures quick distribution of heat. Easily adapted for summer air conditioning. For all fuels in capacities up to 3,000,000 BTUs.



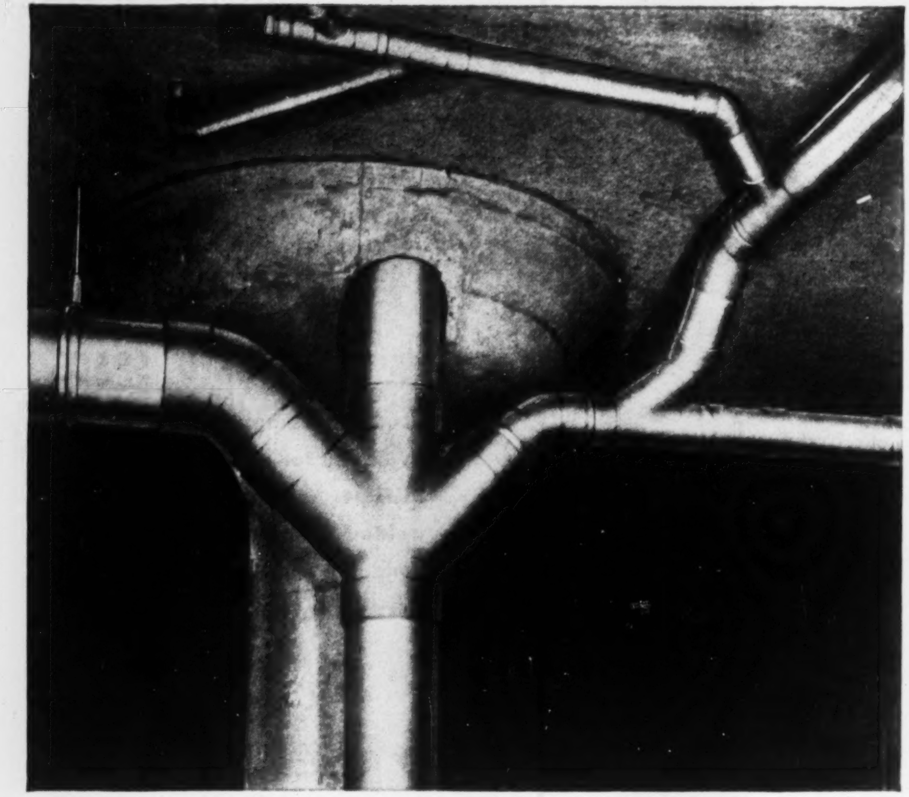
CHECK *this* CHART

Direct Fired Spacer Heater No.	8000 Series Heater No.	Output Capacity B.T.U. Hr. (1)	Heating Surface Sq. Ft. (2)	Nomal Blower C.F.M. for 65° to 140° Temp rise (3)	FIRING RATES (4)		
					OIL GPH	1000 BTU Gas CFH.	Stoker Lbs./Hr.
U8075	8075	725,000	280	8,850	7.0	900	80
U8100	8100	893,000	320	10,900	8.5	1,120	100
U8125	8125	1,080,000	360	13,200	10.5	1,350	125
U8150	8150	1,275,000	440	15,600	12.0	1,600	150
U8175	8175	1,440,000	480	17,500	14.0	1,800	175
U8200	8200	1,725,000	600	21,100	16.5	2,150	200
U8250	8250	2,160,000	750	26,400	20.5	2,700	250
None	8300	2,600,000	900	31,800	25	3,250	300
None	8350	3,000,000	1050	36,600	29	3,750	350

1. Allow 10% to 25% above heat loss figure for pick up load and if heater is not located in room to be heated allow 10% to 15% for radiation and duct losses. The upper figures are preferable for best operating economy and life of the equipment.
2. Heat emission per sq. ft. of heating surface is 3,000 BTU/hr. or less.
3. Air volume and motor size can be varied to fit various conditions and duct systems.
4. An induced draft blower can be furnished if a stack or chimney is not available. The gas passages of the heater are adequate so that an induced draft blower is not ordinarily necessary. Stack connection can be provided through the top of the casing to support a stack through the roof.

CAMPBELL HEATING COMPANY

Des Moines 17, Iowa



only pipelines of copper give all these advantages

Whether you require capillary tubing as small as .025″ I.D., or process conveying lines as large as 26″ I.D., AnacondA Seamless Copper Tubes offer basic advantages presented by no other single piping material.

Copper tubes are strong, rustproof, corrosion-resistant. They remain smooth and clean inside. No rusty scale can form to accumulate built-up deposits. As a result, pumping costs are lower and smaller tubes may be used, since no allowance need be figured for rust-clogging.

Modern solder-type connections eliminate threading. Strong, sound, free-flowing joints are made at lower cost and with lighter tubes. Similarly, copper tube lines can be taken down, moved or have new connections cut in faster. With soft-annealed tubes, bends may be made to clear obstructions, further reducing installation costs.

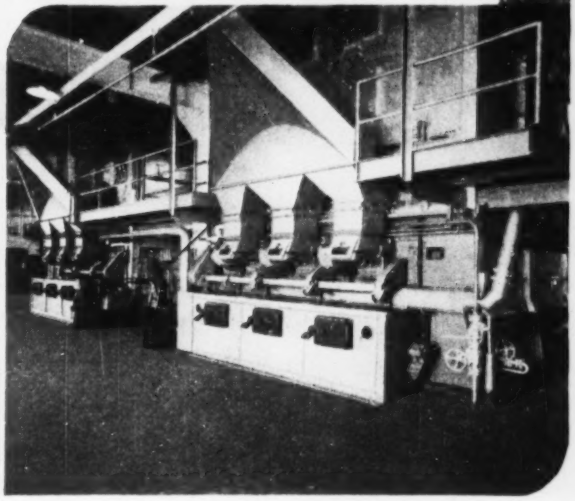
For reliable service on COPPER and COPPER ALLOYS call an Anaconda Distributor. The American Brass Company, Waterbury 20, Connecticut. In Canada: Anaconda American Brass Ltd., New Toronto, Ontario.

AnacondA Copper Tubes are stocked by wholesale distributors from coast to coast. Types K and L in standard sizes are furnished soft in 60-ft. coils, and hard and soft in 20-ft. straight lengths. Type M Tubes 1¼″ and larger are furnished hard in 20-ft. straight lengths for waste, vent and drain lines.

modern piping calls for ANACONDA® copper tubes

CATERPILLAR

NEW PLANTS LIKE CATERPILLAR'S BURN COAL THE MODERN WAY!



Mr. R. H. Bachman,
Plant Maintenance Engineer,
Caterpillar Tractor Co., says:

"Our new plant pictured above was recently completed at Joliet, Illinois. A completely up-to-date coal installation was chosen to handle the heat and process steam requirements. To the right is a picture of the firing aisle showing how the boilers are fed by dust-tight chutes from overhead bunkers. This modern equipment makes coal as clean, convenient, and efficient as a fuel can be! The boilers are rated at 80,000 lbs. of steam per hour, but have handled loads as low as 3,000 lbs. per hour without difficulty."

For big savings, build for COAL! That's a good rule to follow whether you've got a new plant under construction or an older plant being modernized.

Up-to-date coal-burning equipment can give you more steam per dollar . . . modern coal- and ash-handling systems can cut labor costs to a minimum. In addition, coal is the only fuel with virtually inexhaustible reserves. And to mine this coal, to better prepare it for customers' special needs, America has the world's most productive coal industry. Thus, coal users get a double advantage—*dependable supply of an ever better product, at relatively more stable prices.*

For heat, power, process steam—coal is your best bet! Ask a consulting engineer. He'll show you how to cut both fuel and operating costs by burning coal in a modern plant designed to meet your specific needs.

If you operate a steam plant, you can't afford to ignore these facts!

COAL in most places is today's lowest-cost fuel.

COAL resources in America are adequate for all needs—*for hundreds of years to come.*

COAL production in the U.S.A. is highly mechanized and by far the most efficient in the world.

COAL prices will therefore remain the most stable of all fuels.

COAL is the safest fuel to store and use.

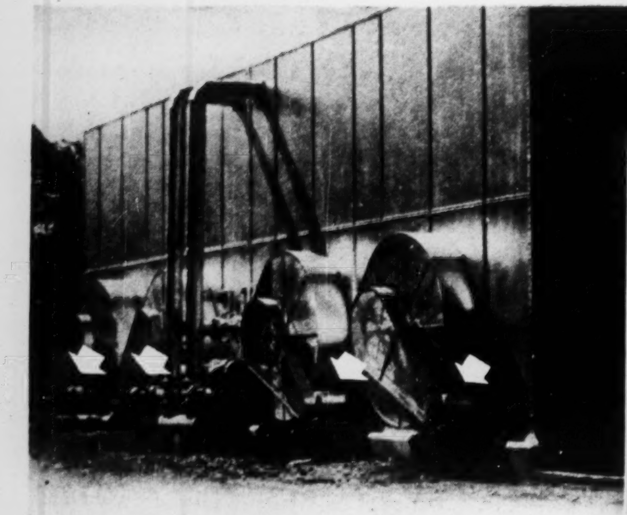
COAL is the fuel that industry counts on more and more—for with modern combustion and handling equipment, the inherent advantages of well-prepared coal net even bigger savings.

BITUMINOUS COAL INSTITUTE

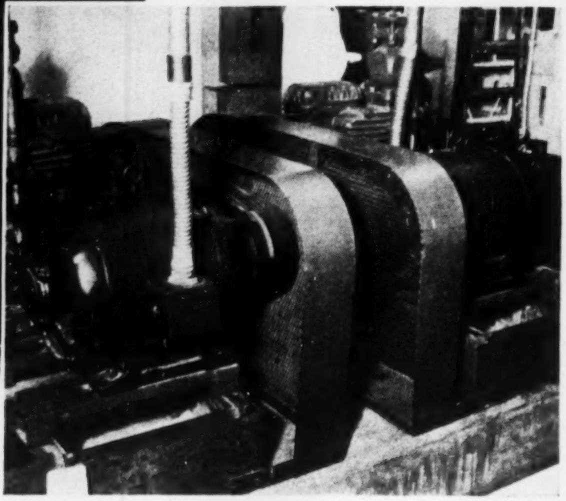
A Department of National Coal Association, Washington, D. C.

FOR HIGH EFFICIENCY *FOR LOW COST*

YOU CAN COUNT ON COAL!



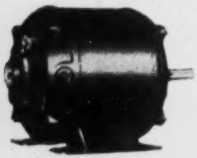
Four Century 5 horsepower splash proof motors driving fans.



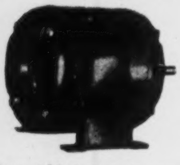
Two Century 30 horsepower motors driving refrigeration compressors.

Century

TYPE SC-
SQUIRREL CAGE MOTORS

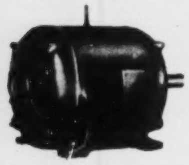


⅛ to ¾ horsepower



1 to 1½ horsepower

2 to 15 horsepower



20 to 125 horsepower

150 to 400 horsepower

Equipment Producers Select Century Motors

To Give You Long-Life Performance With Least Down-Time

The correct selection of the right combination of motor type, speed, power, torque, frame and mounting keeps Century motors on the job.

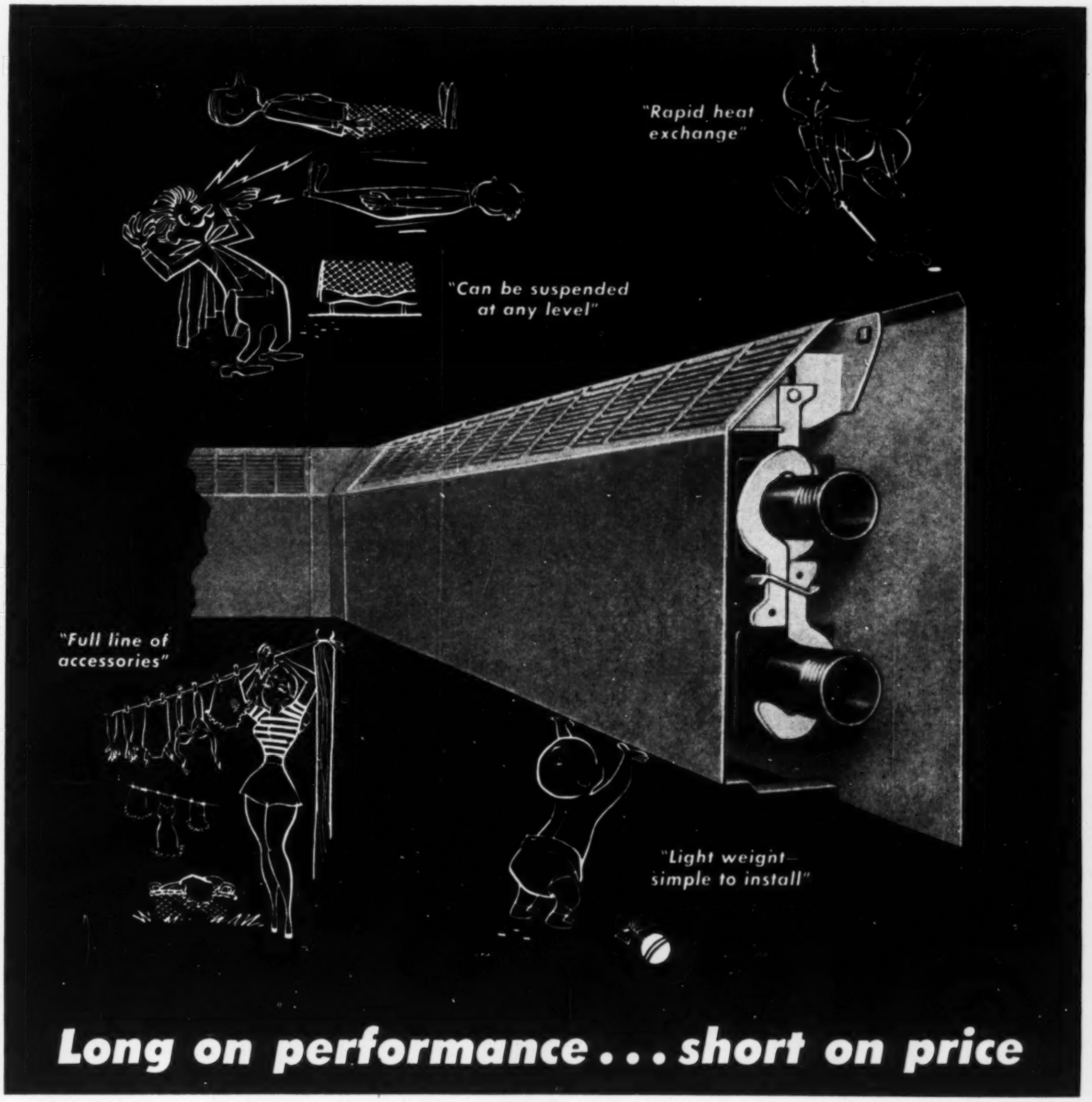
Team work between your motorized equipment producers and Century motor engineers means that you always get the right motor—selected from Century's wide range of types and kinds, in sizes from ⅛ to 400 horsepower for single or polyphase alternating current and direct current. You can be confident that you get top performance from the fine equipment these motors drive.

Skillful application makes sure that Century motors meet the exacting requirements of the machines they drive. That's your assurance of dependability.

CENTURY ELECTRIC CO. 1806 Pine St., St. Louis 3, Mo.
Offices and Stock Points in Principal Cities

CE-690R

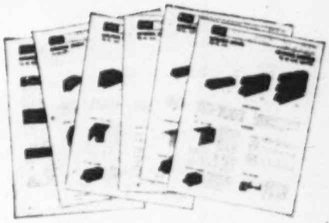
Specify Century C MOTORS for all your electric power requirements


"Rapid heat exchange"
"Can be suspended at any level"
"Full line of accessories"
"Light weight—simple to install"
Long on performance . . . short on price

For low-cost, along-the-wall radiation that looks good *anywhere*—be sure to look at Dunham's new Fin-Vector Radiation.

Three attractive cover designs, plus a complete line of accessories, give the new Fin-Vector a tight, trim, "finished" appearance . . . suitable for any surroundings.

Fin-Vector transfers heat rapidly, operates efficiently at any height above 4" from the floor. Installation costs are low since Fin-Vector goes in so fast, requires few supports, or little on-the-job cutting. Write for full details.

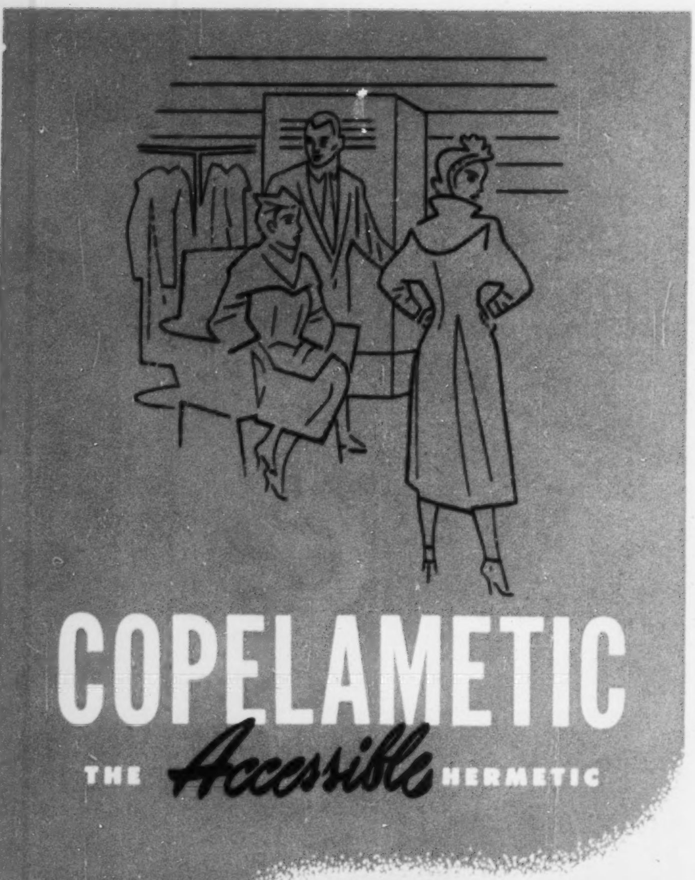


Send For Free Bulletin

Data sheets 1256-2 fully describe and illustrate design and construction features. For your free copies write to: C. A. Dunham Company, Dept. 5, 400 W. Madison Street, Chicago 6, Ill.

DUNHAM **FIN-VECTOR RADIATION**

ANOTHER QUALITY PRODUCT OF C. A. DUNHAM COMPANY—CHICAGO • TORONTO • LONDON

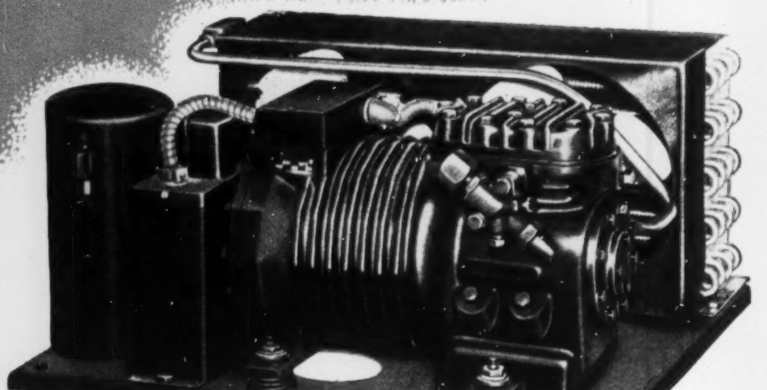


compact . . .
dependable . . .
quiet . . .

Compact . . . dependable . . . quiet. Those are the prime requirements for the refrigeration unit in any air conditioning system. Add to them ruggedness, accessibility and long life and you have the COPELAMETIC.

For the unit that has everything, look to Copeland the pioneer. Practical-minded engineers designed this modern unit without belts, seals or manual oiling, and to top that they made it accessible for servicing on the spot. Specify COPELAMETIC and be sure of a satisfied client for years to come.

There's a Copeland unit for every type air conditioning installation from smallest to largest. Air-cooled, remote COPELAMETICS are made from 1/4 thru 3 HP. There are water-cooled, remote units from 1/3 thru 7-1/2 HP. Self-contained COPELAMETICS are available for all applications. For complete details, write us or call your refrigeration dealer.

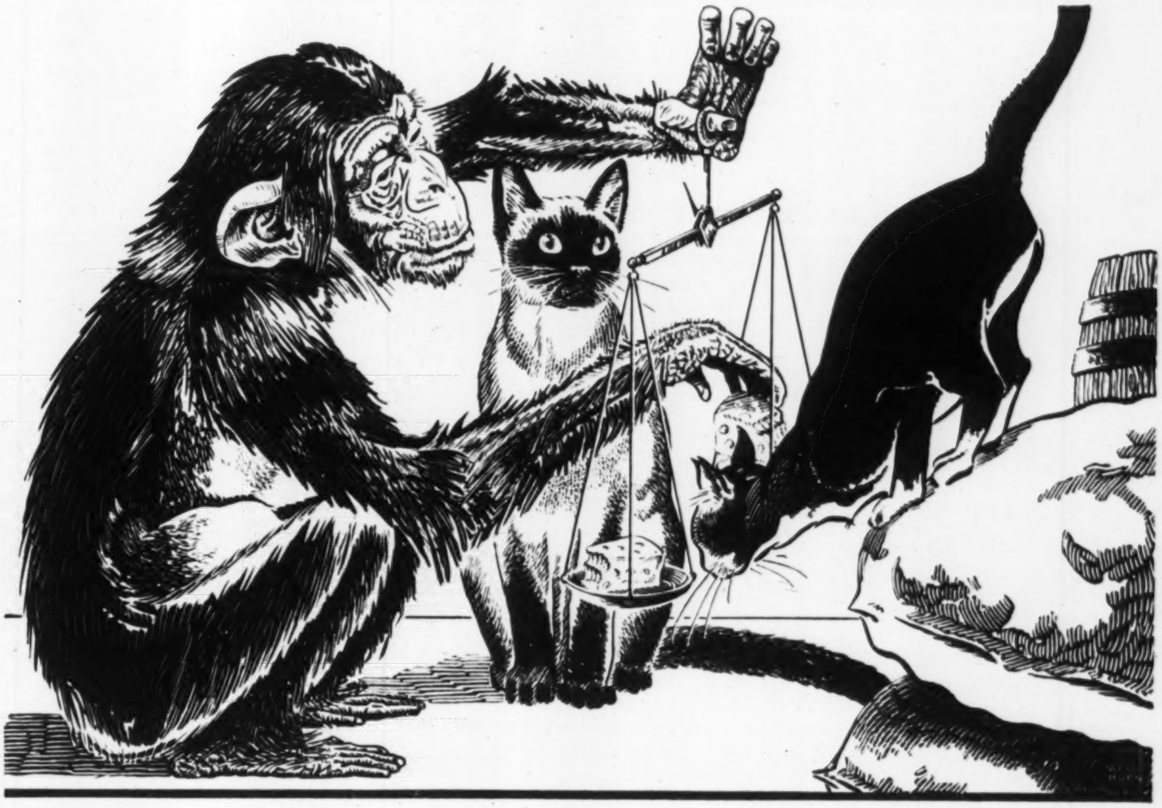


MODEL DE-100 ILLUSTRATED

REFRIGERATION UNITS (OPEN TYPE AND COPELAMETIC) WATER COOLERS

Copeland
DEPENDABLE Electric REFRIGERATION

COPELAND REFRIGERATION CORPORATION • SIDNEY, OHIO



Whose cheese is being divided?

TWO cats could not agree on fair division of a tasty cheese. "Let's go to the monkey," said one, "He is all-wise and can divide our cheese fairly." So to the monkey they went.

The monkey immediately broke the cheese evenly and judicially put the two pieces on the pans of his balance. But one was slightly heavier. He shrewdly nibbled that piece a bit and put it back on the scales. Now it was the lighter piece. So he bit off some of the other piece only to find it the lighter. Thus while the two hungry cats watched, the monkey kept taking bites of the cheese, first one piece, then the other, until finally the cheese had almost disappeared.

"What's left is too small to divide," sagely pronounced the monkey, as he popped the remaining fragments into his mouth.

Observers of the American scene see a direct parallel between the record of federal taxation and this ancient parable of the trusting cats, the greedy monkey and the cheese. Business and the individual citizen have been content to trust government to rule on the disposition of their earnings. And Uncle Sam keeps taking bite after bite out of the shares of both individual citizen and business.

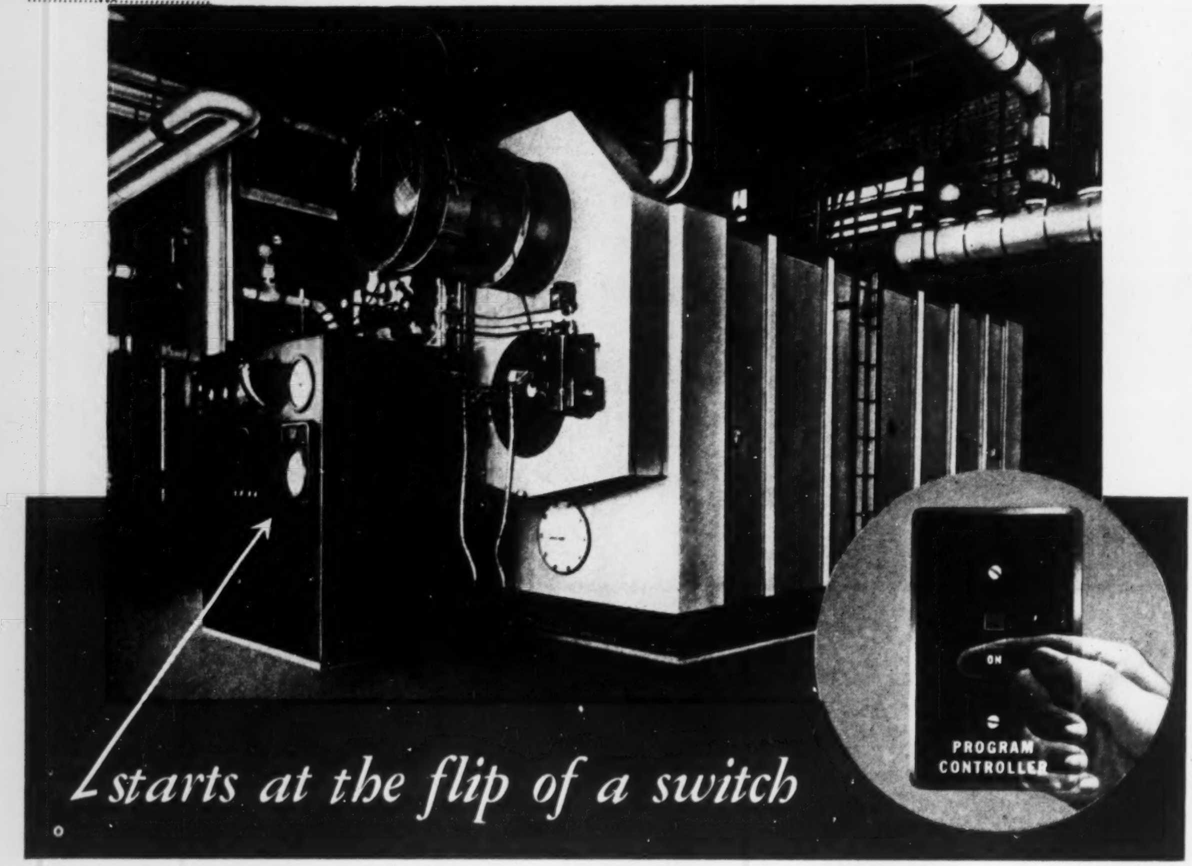
Already government bites are so large as to severely penalize citizens and business alike. If allowed to continue, it will seriously impede further industrial progress and growth, stifle initiative and threaten the strength of our free enterprise system. Beware the day—goal of the socialists among us—when the monkey says, "What's left is too small to divide."

QUALITY
YOUNGSTOWN
SERVICE

The Youngstown Sheet and Tube Company
General Offices--Youngstown 1, Ohio
Export Offices--500 Fifth Avenue, New York
MANUFACTURERS OF CARBON ALLOY AND YOLOY STEELS

RAILROAD TRACK SPIKES - CONDUIT - HOT AND COLD FINISHED CARBON AND ALLOY BARS - PIPE AND TUBULAR PRODUCTS - WIRE - ELECTROLYTIC TIN PLATE - COKE TIN PLATE - RODS - SHEETS - PLATES.

shop-assembled Integral-furnace boiler, type FM



Automatic, efficient boiler operation with complete safety is assured by the positive dual control system offered with the B&W FM Boiler.

After the usual service operations are performed—water, fuel, and electric power turned on—a flip of a switch sets the starting program controller in operation and, in a matter of seconds, your FM Boiler is started.

Not only that! During the start-up, your FM Boiler is protected by sensitive safety devices, available with this unit, that automatically shut down your FM Boiler at the first detection of even slight malfunctioning. These electrical "policemen" act faster than an operator in case anything unusual happens—as it sometimes does with any boiler.

After your FM Boiler is started and is up to pressure, an automatic control not only provides fuel feed as required but also proportions fuel and air for best performance, all under control of safety devices.

When load conditions are so light that your FM Boiler must operate below about 25% of rated capacity—always a troublesome condition—an ON-OFF control is available to smoothly and safely start and stop the boiler automatically on the proper cycle to keep steam pressure within desired limits.

Boiler feedwater also is regulated automatically by a sensitive thermo-hydraulic control system which keeps in step with steam demand.

Full details about shop-assembled FM Boilers with steam capacities of 2900 to 28,000 lb per hr are given in Bulletin G-76. Write for it! *The Babcock & Wilcox Company, Boiler Division, 161 East 42nd St., New York 17, N. Y.*

BABCOCK & WILCOX
BOILER DIVISION

G-566

THE EDITOR'S PAGES

WE SAY "THANKS" — Getting this big issue of HPAC out has involved not only the best efforts of our own staff, but the cooperation also of the hundreds of manufacturers whose products and equipment are classified in the Directory Section, as well as the hundreds of firms whose displays are previewed in the Show Section. To all who helped us in this big editorial operation, we express our sincere thanks.

IF YOU'RE GOING TO BE IN CHICAGO . . .

IF YOU PLAN to be in Chicago this month for the International Heating, Ventilating and Air Conditioning Exposition and the annual meeting of the ASHVE, study in advance the special Show Section published in this issue and check the products and equipment to be displayed so you won't miss what you want to see when you get there.

It's a good idea to have your copy of HPAC with you in Chicago so that it'll be at hand for ready reference during the busy week.

The Show Section "previews" the exhibits, gives details of the ASHVE meeting program, and other information.

"QUOTE"

"Houston is said to be the most air conditioned city in America — and certainly there are few cities that need it more. With the humidity high and energy low, everyone clings to the spots that are cool. Our people do business in air conditioned buildings, and many of them live in air conditioned homes. If they are not fortunate enough to have an entirely cooled house, they do their best to make at least one room comfortable.

"In the face of this, our church building was very much out of step. When the church officials proposed cooling our building, it met with unanimous approval.

"It is needless to say that having completed this modern touch of comfort, the services through our long summer season are better attended, quiet and worshipful. It is one of the best investments we have made.

"All of our offices are cooled also for weekday use, with the result of a far happier and more efficient staff.—JOE S. STROTHER, Minister, Bering Memorial Methodist Church, Houston.

OIL BURNER "OLD TIMERS" PLAN GET-TOGETHER

MEMBERS OF THE Old Timers' Club of the oil burner industry are planning a night of relaxation the evening of January 27, during the week of the International Heating & Ventilating Exposition in Chicago.

The get-together will be held under the auspices of the Midwest Old Timers' Club at the Furniture Club in the Furniture Mart, and tickets will be $10 each H. A. Maccubbin, 120 Madison St., Villa Park, Ill., is handling the reservations. This affair is open only to members of the Old Timers' Club.

BIG DIRECTORY SECTION APPEARS THIS MONTH

A COMPLETE Directory Section of Heating, Piping and Air Conditioning Equipment for Industrial, Commercial, Industrial and Public Buildings — thoroughly revised and brought up-to-date — appears for the 19th consecutive year in this month's issue of HPAC (see the yellow pages.)

Information on what will be available where during 1953 is carefully classified for your use throughout the year, along with complete street addresses and trade names, and a compilation of products and equipment advertised in this issue.

The Directory Section is a plus feature of this month's HPAC, which also brings you the regular editorial content (including the Journal Section of the American Society of Heating and Ventilating Engineers.)

TURBINE PUMP MAKERS DISCUSS WATER SOURCES

UNDERGROUND WATER SOURCES, their conservation, protection and use was the principal topic of discussion at the semi-annual meeting of the National Association of Vertical Turbine Pump Manufacturers, held at New Orleans.

Leland C. Kimball, sales manager of the Byron Jackson Co. and retiring president of the association, reported on the association's activities of the past year, and papers on topics of interest to the association and the pump industry were presented by W. C. Mumford, manager of the vertical turbine pump division, Worthington Corp.; G. F. Twist, general manager of the Peerless Pump Div., Food Machinery and Chemical Corp.; Charles E. Wilson, honorary director of the association; T. E. Woodruff, manager of the pump department, Fairbanks Morse & Co.; and H. E. Carloss, vice president of the Deming Co.

The new association officers are Mr. Twist, president; Mr. Woodruff, vice president; and secretary, B. A. Tucker, of the Peerless Pump Div., Food Machinery and Chemical Corp. The association will meet again February 16 and 17 at Las Vegas, Nevada.

ESTIMATES '53 CONSTRUCTION SAME AS "BOOMING '52"

DOLLAR VOLUME of construction in 1953 "practically equal" to that of booming 1952 is foreseen by F. W. Dodge Corp. in its annual advance estimates in Architectural Record.

The advance estimates are prepared by Thomas S. Holden, president, and Clyde Shute, manager of Dodge's statistical and research division. They apply to the 37 eastern states covered by Dodge construction news gatherers, and are accepted by the industry as a factual basis for 48-state construction indexes.

It is believed that by the end of 1952 the Dodge figures reached 16,008 millions of contracts awarded in all categories of construction, and the estimate is that the 1953 total will be 16,020 millions — a change of virtually zero.

Within that framework, the following changes in dollar volume as between 1953 and 1952, are estimated: nonresidential, up 8 percent; residential building, down 11 percent;

total building, down 2 percent; public works and utilities, up 8 percent. Dollar volume of private building and engineering contracts is expected to decrease 7 percent; public building and engineering contracts are expected to increase by 10 percent.

Total new building floor space to be contracted for is estimated at 1,107,000,000 sq ft for 1952, and 1,038,000,000 sq ft for 1953.

New non-residential floor space, with an indicated overall 3 percent increase in 1953, is expected to include increased volume of commercial building, educational and science buildings, hospitals and institutions, public and social and recreational buildings. The reason anticipated dollar volume of non-residential building shows more favorably than non-residential floor space is that certain large atomic energy projects are projected for 1953. These projects will of necessity be recorded in terms of dollars only, since dimensions and floor area figures will not be revealed.

In terms of new floor space and dollars, new residential building is expected to decline 11 percent in 1953; new dwelling units are expected to decline 12 percent. These estimates assume that there will be no marked easing of housing credit.

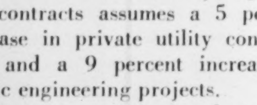
The anticipated 8 percent increase in dollar volume of heavy engineering contracts assumes a 5 percent increase in private utility construction and a 9 percent increase in public engineering projects.

There is a continuing heavy demand for community improvement projects of every sort, including schools, highways, water supply and various other categories. The major limitation on the volume of such projects is the extent to which financing can be made available, according to Dodge.

Only minor changes in overall business trends are expected by a majority of a panel of 137 of the nation's leading economists recently polled by Dodge. High level stability is expected to characterize general business conditions through most of the year, with the possibility of a quite mild set-back in the second half.

Total output of goods and services, sometimes defined as gross national product, is expected by a majority to increase moderately during the first half of the year and to recede moderately during the second half. The median estimate is $348.2 billions for 1953 as compared with an estimated final total of $344.1 billions for 1952.

SECRETARY OF LABOR



Ransdell Photo

MARTIN P. DURKIN, General President of the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry of the United States and Canada (the "UA," for short), who becomes Secretary of Labor this month

STEEL BOILER INDUSTRY OPTIMISTIC

General optimism over the future of the steel boiler industry was expressed at the fall meeting of the Steel Boiler Institute.

R. A. Locke, manager of the institute, reported that the number of steel boilers shipped in the first three quarters of 1952 was 108 percent of the number shipped during the corresponding period in 1951. It is evident from the figures, he commented, that the steel boiler industry is more than holding its own in the heating field.

A recommendation of the engineering committee that the gross output ratings of steel boilers hereafter be listed in catalogs and other literature was adopted by the institute. Previously only the SBI ratings have been shown.

An increasing demand to furnish complete boilers, including relief valves, was reported by the engineering committee. The committee recommended that a proposal be submitted that *Simplified Practice Recommendation R*157-50 covering steel boilers be amended by the Bureau of Standards to include relief valves as standard equipment with water boilers.

Members of the boiler output committee of the Heating, Piping and Air Conditioning Contractors' National Association met with the SBI engineering committee for discussion of problems in connection with establishing a test code for those boilers which cannot be rated under existing rating codes.

CLOSED CIRCUIT TV WATCHES SMOKESTACKS

According to Steelways, magazine of the American Iron and Steel Institute, closed circuit television is finding new uses in industry all the time. In Chicago, for example, an electric generating company keeps continuous tabs on its four smokestacks by TV. When it rains, the furnace firing crews turn on a remote control windshield wiper to keep the camera lens clear.

INDEX FOR 1952 TO BE AVAILABLE ON REQUEST

An index for HPAC's 1952 issues, Vol. 24, Nos. 1-12, including the Journal Section of the American Society of Heating and Ventilating Engineers, is being compiled and will be available soon to HPAC's subscribers on request. If you want a free copy, send a note or postcard to the Editors, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.

We'll keep your request on file until the index has been printed, and will then mail a copy to you.

A. C. SHIPMENTS SET RECORD

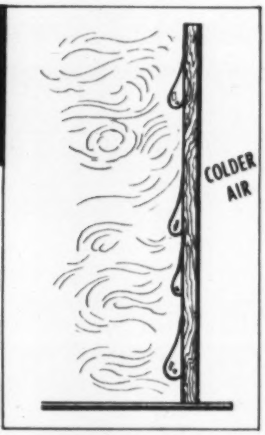
Shipments by Carrier Corp. set a new record during the fiscal year ended October 31, totaling 112,185,000 lb or about 2252 carloads. This far surpassed the 88,214,000 lb shipped in fiscal 1951, the previous record year.

A major factor in these record shipments was the hot weather of last summer. However, the demand for air conditioning equipment has continued at high level during recent months, due largely to the boom in residential air conditioning, plus offseason buying to insure having equipment ready for delivery next summer, according to Carrier.

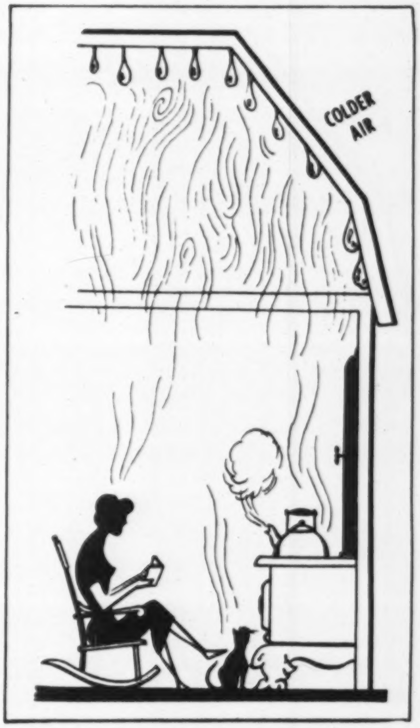
MARCH OF DIMES
FIGHT
INFANTILE
PARALYSIS
JANUARY 2-31

How to Stop CONDENSATION!

Prevent Damage to Wood, Plaster, Paint, etc.



Condensation forms when temperature of contacting air is reduced below dew-point by a cold surface.



Condensation forms when the capacity of an air space at a given temperature is too small for the amount of vapor present →

As air grows colder, it can hold less vapor. Saturation increases until a dew-point is reached, and condensation occurs. The surface of a material colder than the contacting air it faces, and continuously losing heat on the other side, will continuously extract heat from the air by direct conduction. The denser and bulkier the material, the more heat will it extract and store before attaining room temperature, if it ever does.

For example, if ordinary insulation is installed with air spaces on both surfaces, it continuously absorbs and emits heat rays at a rate of over 90%. If installed without air spaces, there is even more heat flow continuously by direct conduction through solids. Each square foot contains about 363,314 fibers, with surfaces aggregating approximately 46 sq. ft. for possible condensation formation.

With multiple sheets of accordion aluminum, the sheet nearest the warm room weighs only 1/4 oz. per sq. ft., absorbs and radiates only 3% heat; thus extracts and stores practically no heat from the air, only enough to attain and remain at room temperature. The additional reflective air spaces on the other side are insignificant heat conductors. The other sheets of aluminum and fiber block convection heat losses to the "cold" side.

No condensation forms on the aluminum surface next to the warm room, for a dew point is never reached. The sheet's other surface faces a space which is a *little* colder than the aluminum. Since warmth flows to cold in radiation and conduction, the aluminum will *give off* a *slight* amount of *heat* to the colder space, thereby slightly *increasing* its vapor retaining capacity; which prevents condensation.

The next reflective space has almost the same temperature as the next aluminum surface, with its slight mass, 1/4 oz. per sq. ft. The aluminum absorbs and emits little heat. Its other surface is slightly warmer than the air it faces; again there is no extraction of heat (the REVERSE), so no dew point.

With 4 or 6 reflective spaces, there can be no dew point anywhere on or in such aluminum insulation. Should rain leak in, it will be slowly expelled as vapor, since exterior walls, in comparison to aluminum have a far greater permeability than the required minimum 1 to 5 ratio. Because aluminum is impervious to vapor flow, condensation on under surfaces of roofs and inner surfaces of outer walls is minimized.

THERMAL FACTORS, TYPE 6 INFRA

Up-Heat	C.089, R11.23 equals 4-3/5"	DRY Rockwool
Wall-Heat	C.073, R13.69 equals 5-5/8"	DRY Rockwool
Down Heat	C.044, R22.72 equals 9"	DRY Rockwool

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525 Broadway, New York, N. Y. Dept. H-1

Please send me FREE, U.S. Bur. of Standards booklet: "Moisture Condensation in Building Walls."

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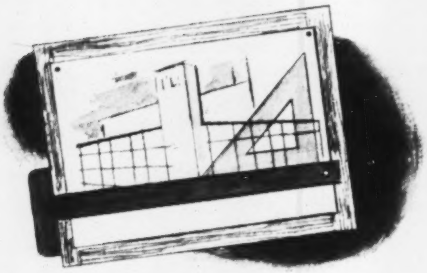
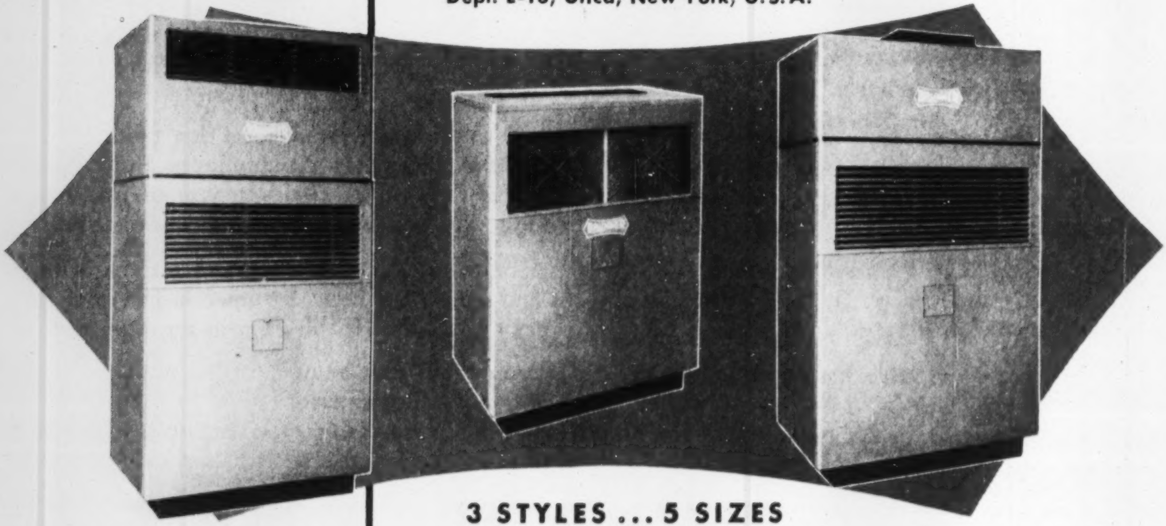


For the many installations where efficiency and economy must be combined with application flexibility—these new "packaged" BRUNNER AIR CONDITIONERS are the answer! Precision-built, powered by the famous Brunner quiet slow-speed compressors—these self-contained units permit complete freedom of application planning for every type of job. Easy to install anywhere—and, like all Brunner products, they are engineered for fast, simple servicing *in the field.*

15 models to choose from—for within room-circulating or remote duct operation. Attractive enamel cabinets clean easily—blend into any decorative plan. A FIVE YEAR WARRANTY on the Brunner Compressor in every unit assures satisfactory service. See these BRUNNER Air Conditioners ... see how they can fit *profitably* into *your* air conditioning picture ...

Brunner Manufacturing Company
Dept. L-13, Utica, New York, U.S.A.



3 STYLES ... 5 SIZES

Brunner Air Conditioners are available in 3 styles (shown above)—each style in 2, 3, 5, 7½ and 10 H.P. sizes. Complete information, specifications and ratings sent upon request.

YOU'LL ALWAYS BE GLAD YOU INSTALLED A BRUNNER
SINCE 1906

"OPEN FOR DISCUSSION"

We follow here each month the practice at engineering society meetings of providing an "open for discussion" period. You are urged to participate. Address your comments to the Editors, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.

USING AIR DIFFUSERS WITH EGG-CRATE CEILINGS

REFERRING TO THE air distribution studies for the egg-crate or louvered ceiling design for the new Detroit Edison Co.'s office building — described by R. V. Martelli and H. O. Scarlett in their article in the November HPAC — the air distribution research undertaken in the past few years by Professor Tuve and his associates at Case Institute of Technology, and Dr. Nottage and his associates at the Research Laboratory of the ASHVE, has resulted in valuable progress in the analysis of air distribution problems. However, this progress does not permit predicting the behavior of air streams for all possible situations, and careful experiments are still helpful in evaluating a particular air distribution problem. The air distribution studies made for the new building in Detroit are of great interest, therefore, to everybody concerned about correct air distribution, and Messrs. Martelli and Scarlett should be complimented for having discussed these tests in the pages of HPAC.

The new building has a large exposed surface and a high intensity lighting load (5.5 watts per sq ft of floor area), and it is necessary to supply 16.7 air changes per hour at 18 F effectual temperature difference. This, together with the fact that a louvered ceiling is to be used for the lighting scheme, make careful selection and location of the air outlets imperative. It was decided, therefore, to test various air outlets in a specially constructed test room under actual operating conditions.

The size of the test rooms, 10 ft by 13 ft by 9 ft, 3 in. ceiling height, corresponded exactly with the size of the actual rooms in the building, and followed the actual design even to the extent of providing a second ceiling in order to duplicate the underside of the floor slab above the actual room, including the fireproofed beams.

According to the ASHVE's Heating, Ventilating, Air Conditioning Guide, the object of air distribution is to create within a space the proper combination of room temperature, air motion and humidity. Although it is difficult to establish a specific standard for the permissible room air motion, it is generally agreed that velocities of less than 15 fpm cause a feeling of air stagnation whereas velocities higher than 65 fpm may result in a sensation of draft. Air velocities of 25 to 35 fpm in the occupied zone (floor to 6 ft above floor level) are most satisfactory, but a room air motion of 20 to 50 fpm will usually be acceptable.

Following the recommendations of the Guide, the authors in their test specified that the air distribution system should be judged to be satisfactory only if air motion did not exceed 50 fpm below the 6 ft level. They also specified that the temperature variation in this space should not exceed 1 F.

The following air distribution systems were tested: (1) a standard commercial window sill supply system; (2) various makes of a centrally located ceiling diffuser on exposed ductwork; (3) two upsweep elbows feeding from the top of the supply duct and discharging upward against the underside of the floor slab; (4) continuous slots in the top of the duct; and (5) grilles in the top, the two sides and the bottom of the duct.

None of these systems worked satisfactorily with 16.7 air changes per hour, say the authors, causing either drafts or, in the case of the ceiling diffuser, noise. Ceiling diffusers worked satisfactorily up to 11.3 changes per hour, but were noisy with higher air changes and, when replaced by a larger outlet, caused drafts.

Finally, four equally spaced perforated tubes installed about 18 in. above the louver ceiling were used for air distribution purposes, and the authors claim that this distribution system meets design conditions after "the problem of pileup was eliminated by taping off every fourth set of holes in the downstream one-third of each tube, which gave a spacing of 3 in. on centers for the first two-thirds and 4 in. on centers for the last one third of tube length." The authors also state that the "differences in air delivery between tubes were minor, but what differences did exist were corrected by dampering — which merely consisted of sliding the tubes in or out of the header".

We have successfully used air diffusers in similar schemes above egg-crate or louvered ceilings, and with air changes even higher than 16.7 changes per hour. We agree with the authors that for good distribution the diffusers must be mounted a reasonable distance above the louvered panel to "allow a spread of the supply air before it impinges on the louvered panel and is deflected down into the room". If high air quantities are discharged, however, the available space above the egg-crate may not be high enough to permit a sufficient spread, and we recommend for this reason the use of several equally spaced — instead of one centrally located air diffuser. Our experience proves that the diffusers will function properly, if this is done, and there will be no drafts in the occupied zone.

Fig. 6 of the article by Messrs. Martelli and Scarlett shows "typical air distribution pattern for single diffuser when supplying over 13 room changes per hour". According to the authors, a "swirling motion was set up in the room in such a way that most of the supply air would come down through the louvered panel in one half of the room, while induced room air travelled up through the louver into the ceiling space to the other side". It should be pointed out that this one-sided discharge of the supply air has nothing to do with the fact that a louvered ceiling was used. One-sided air flow is a common phenomenon in air distribution but it can be eliminated by proper design and the use of equalizing deflectors, baffles and other accessories.—WM. O. HUEBNER, Anemostat Corp. of America.

PIPING SYSTEMS THAT CAN'T BE SHUT DOWN

I HAVE READ J. H. Shaw's article in the December HPAC on piping systems that can't be shut down, and A. C. Kirkwood's article in November on the cost of process piping shutdowns. I would like to make the following comments based on my experience in the refrigeration industry:

If a process is so important that it can't be shut down for normal maintenance or major overhauls, then it seems advisable to install duplicate equipment with duplicate piping. Most refrigeration jobs are in this class and the good designer arranges all major equipment with standby units which will carry the load on a "get by" basis during repairs. Compressors, condensers, brine coolers, brine pumps, etc. are designed in multiple for operation during repairs.

The presence of a valve in a pipe line does not mean that the equipment can be necessarily isolated sufficiently to make it accessible to workmen. Quite often a valve becomes merely an orifice due to slag or scale on the seat or due to careless handling by an operator. Good design requires two valves in series where dangerous conditions will exist due to the failure of a valve to seat. Those readers who have attempted to retube a condenser with a leaky ammonia valve will appreciate the problem.

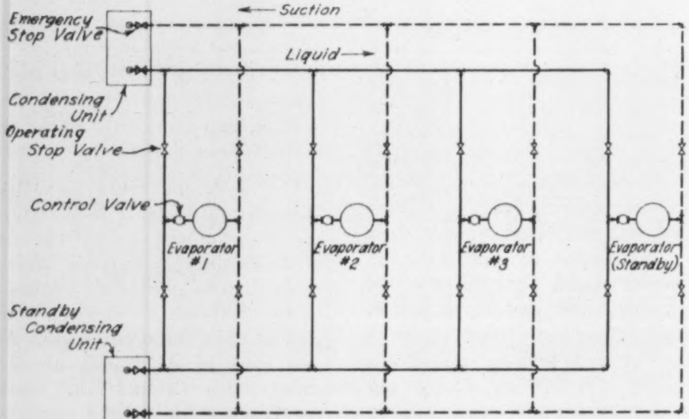
The accompanying sketch of a process hookup using standby units and dual valving would meet the "you can't shutdown" requirement, in my opinion.

The scheme suggested has one weakness to the "Freon-"minded reader; that is, oil return from one condensing unit to another. This system will work more satisfactorily on ammonia or, if "Freon" is to be used, oil return piping and equalizer lines should be added to the diagram. The point is valve arrangement and not refrigeration details.—JOHN A. HOLBROOK, Belden Porter Co., Mechanical Contractors.

HOW MUCH OIL STORAGE IS RIGHT?

I READ WITH interest the comments in the November HPAC by E. J. Husarik and Joseph L. Fatz, Jr., about the problem of supplying sufficient storage for oil for heating schools.

I have been in the fuel oil and oil burner business for the past 29 years and have always advocated large storage tanks. All of the fuel oil companies urge their dealers to sell adequate fuel oil storage so that oil can be brought out of storage during the slack period, and in this way they may refill at their plants. Some companies in Philadelphia will not sell No. 5 oil in less than 1000 gal lots, and others charge extra for small drops.



STANDBY UNITS and dual valving as suggested by Mr. Holbrook to prevent shutdowns. Sketch does not include oil return piping and equalizer lines

In the school in question, it appears that the average oil consumption would amount to 15,000 gal per season. I would recommend a 2000 gal oil storage tank for this installation as a 550 gal tank is entirely too small. There is no leeway for bad weather or other unforeseen conditions.

I would advise at all times to be on the safe side and specify tanks for large storage. A good rule to follow is to multiply the average daily consumption by 20 and specify a tank capable of storing that amount of oil. For example, at the school in question the average daily consumption is 90 gal. Multiplying by 20 would give 1800 gal — so that a tank of 2000 gal capacity would be just right for this installation.—A. A. ABRAHAMS, Vice President, Federal Oil Burner Co., Inc.

SIZING FUEL OIL TANKS FOR SCHOOLS

I WAS INTERESTED to see the comments — in the November issue of HPAC, which I consider a very fine magazine — by E. J. Husarik regarding fuel oil storage tanks for a school.

During my time with the Los Angeles school system, we developed a design procedure which I think may be of interest to HPAC's readers. After estimating the monthly consumption of a boiler plant, we called the local fuel oil distributor and found out what the standard size truck or truck and trailer combination capacity was and then sized our fuel oil storage tanks so that they could receive a full truck load when they reached the 75 percent empty level.

We found that this practice saved us a considerable amount of money over a period of years because the price per gallon of fuel oil, when a partial truck load is delivered, is higher than when a full truck load is delivered. — STUART GILES, Heat and Power Div., Equipment Research Dept., U. S. Naval Civil Engineering Research and Evaluation Laboratory.

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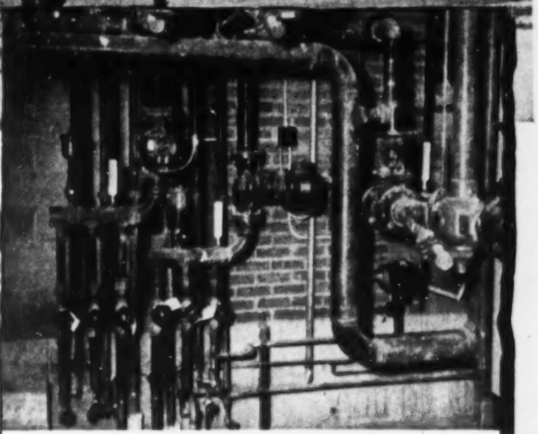
Motor Inn
AND RESTAURANT
COL. JAMES P. SCHWARTZ,
PRESIDENT AND GEN. MGR.



Architect—Benjamin A. Crowther. General Contractor—Decker Construction Corporation, both of Elmira, N. Y. Heating Contractor—A. J. Eckert Company Incorporated, Albany, N. Y. Revere Dist. —LeValley-McLeod, Schenectady, N. Y.

ANOTHER CASE OF *Copper* WHERE IT COUNTS

This ultra-modern Motor Inn located just outside of Albany, N. Y., on Route 20 has all of its 100 rooms, lobby and dining room heated by radiant panel heat. Almost 24,000 feet of Revere non-rusting Copper Water Tube was used. A section of the control system is shown in photo at top right. System was designed for zone control, a most desirable feature of radiant panel heating. Note compactness and neatness of installation when you use Revere Copper Water Tube.

Now with restrictions eased, and quantities permissible without allotments greatly increased, there isn't any reason why your next job can't have the many benefits of Revere Copper Water Tube for radiant panel heating, hot and cold water lines, underground service lines, processing lines, and waste stack and vent lines. See the Revere Distributor nearest you today. And, if you have technical problems, he will put you in touch with Revere's Technical Advisory Service.

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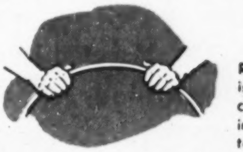
WHY REVERE COPPER WATER TUBE IS PREFERRED BY

Architects, Builders, Plumbing & Heating Contractors

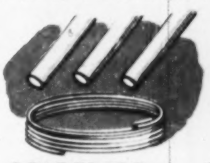


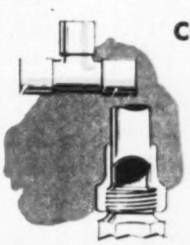
EASY TO BEND
Saves Time

Revere Copper Water Tube is easy to bend. Soft temper can be bent by hand to meet installation conditions. Hard temper by hand bending tools.

HANDY LENGTHS
Save Fittings . . . Labor

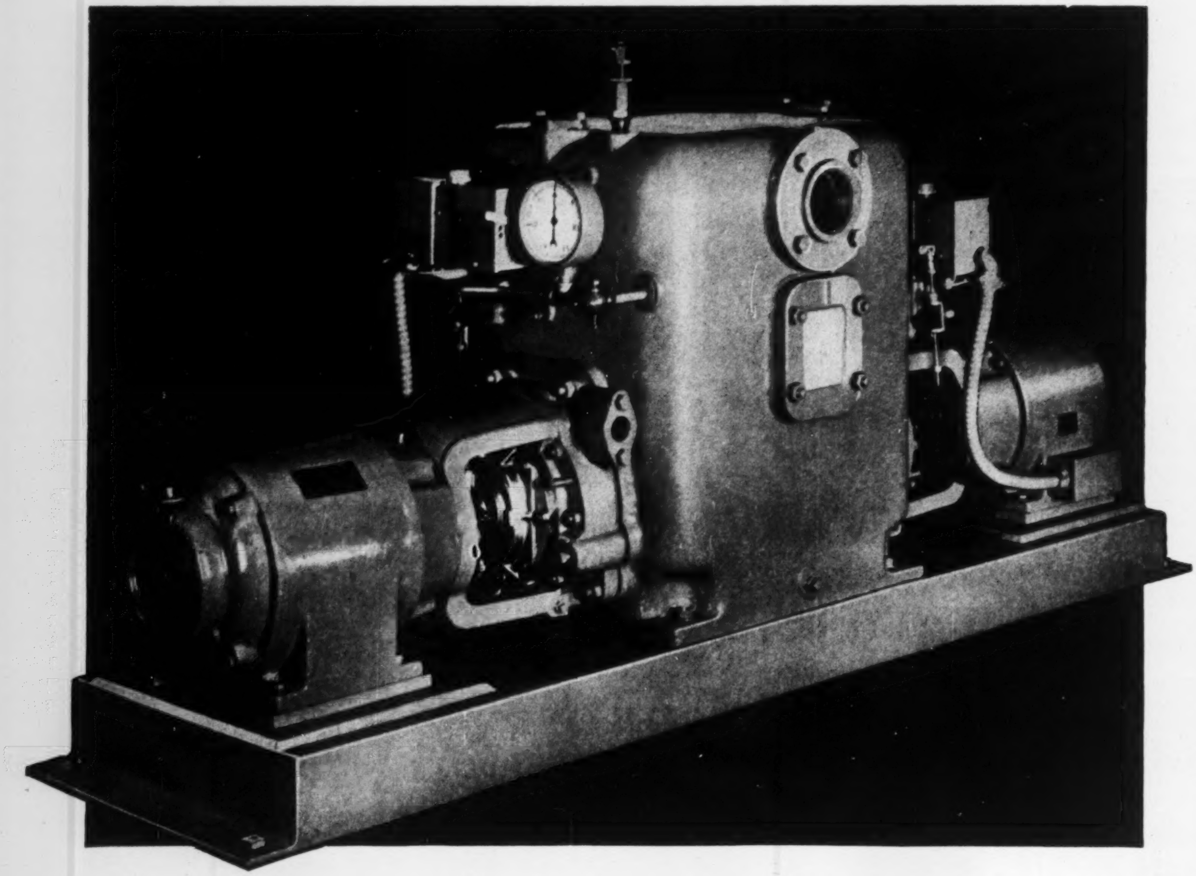
Revere Copper Water Tube comes in straight lengths of 20′ in hard and soft tempers. 60′ coils of soft temper reduce the number of fittings needed.





SOLDER OR COMPRESSION FITTINGS
Need Less Work Room . . . Save Metal

No worry about wrench room when you use Revere Copper Water Tube with solder fittings. Compression fittings can also be used. No threading is necessary with either type fitting. Wall thickness of tube used can thus be less than for threaded pipe.



THE HEATING PUMP WITH CERTIFIED PERFORMANCE

A Jennings Return Line Vacuum Heating Pump may be installed with the absolute assurance that it is of the proper capacity to keep your heating system at top-notch efficiency.

For the actual working capacity of your Jennings Pump is determined by careful tests under working conditions, and with the actual motor that goes on your job, regardless of current characteristics. Every Jennings Pump has to deliver full rated capacity of air and water simultaneously before it is released.

The Jennings Heating Pump has everything in the way of safety, convenience, and real dollar saving economy that years of experience as leading heating pump manufacturers have enabled us to put into it. Quality is backed by an unchallenged reputation, and satisfactory performance is assured by a nation-wide network of Sales and Service offices.

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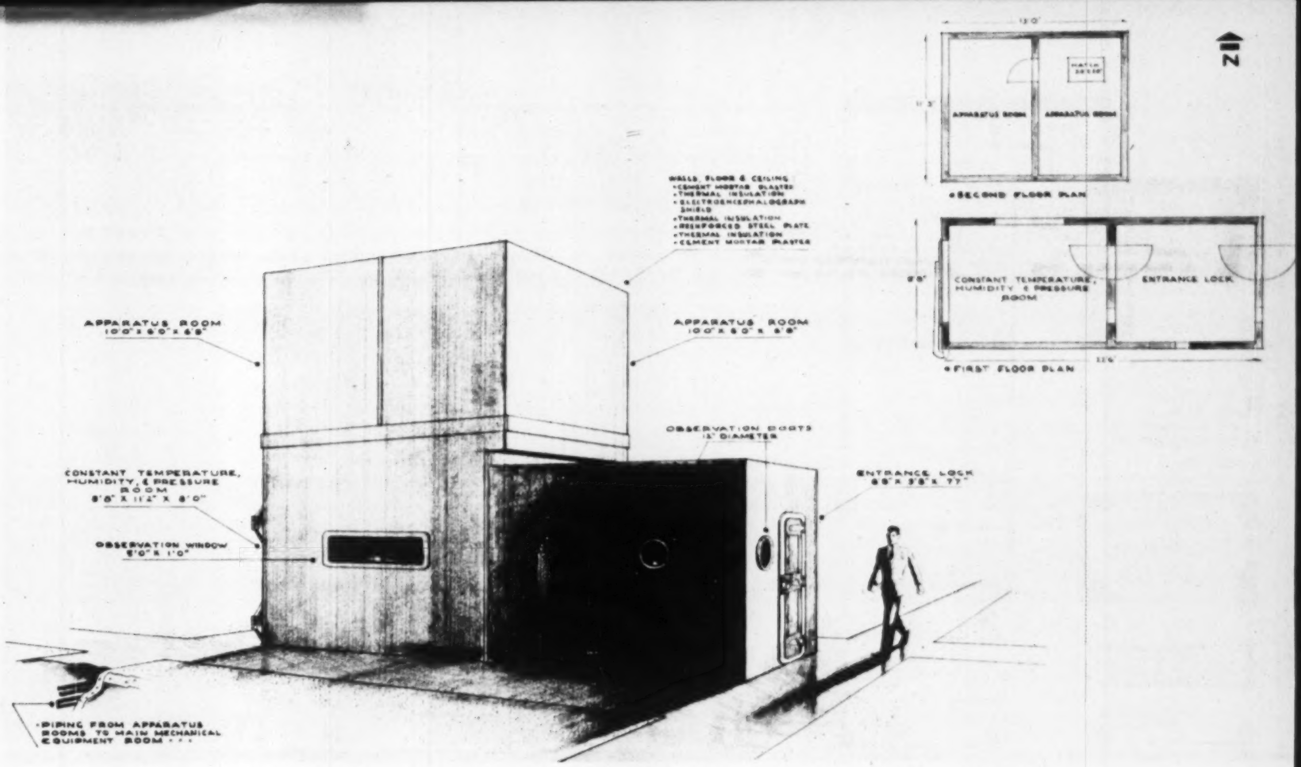
WALLS, FLOOR & CEILING
• CEMENT MORTAR PLASTER
• THERMAL INSULATION
• ELECTROENCEPHALOGRAPH SHIELD
• THERMAL INSULATION
• REINFORCED STEEL PLATE
• THERMAL INSULATION
• CEMENT MORTAR PLASTER
APPARATUS ROOM 10'0" x 6'0" x 6'8"
APPARATUS ROOM 10'0" x 6'0" x 6'8"
CONSTANT TEMPERATURE, HUMIDITY, & PRESSURE ROOM 8'8" X 11'2" X 8'0"
OBSERVATION WINDOW 5'0" x 1'0"
OBSERVATION PORTS 12" DIAMETER
ENTRANCE LOCK 6'8" x 3'8" x 7'7"
PIPING FROM APPARATUS ROOMS TO MAIN MECHANICAL EQUIPMENT ROOM
13'0"
11'3"
APPARATUS ROOM
APPARATUS ROOM
HATCH
SECOND FLOOR PLAN
8'8"
CONSTANT TEMPERATURE, HUMIDITY & PRESSURE ROOM
ENTRANCE LOCK
FIRST FLOOR PLAN
N

FIG. 1—MAINTENANCE OF PRESSURE above or below atmospheric involves heavy construction and extensive equipment. Here's a layout for a constant temperature, humidity and pressure room which illustrates a unit designed to control these environmental factors

Controlling the Environment

. . . . for clinical research. Background and development of facilities at the University of Illinois

By M. K. Fahnestock, E. P. Heckel, Nathaniel Glickman and Tohru Inouye

CLIMATE HAS PROBABLY had as much influence on the development of civilization as any one thing. It affects the food supply of the world on which man and animal life depend, and thereby influences the economy and manner of life of countries and continents. Certain traits and characteristics of people can be traced to their climatic exposures and to the available foods in the areas of the world in which they have lived.

Up until a few years ago, relatively few persons moved from one climate into a widely different one — but modern forms of transportation, present world trade, and global wars have changed this. Entire armies are now moved from one extreme of climate to another in a matter of days. Civilian occupational forces made up of persons who (as well as their ancestors) had experienced only one climate are now uprooted and set down in entirely different atmospheric environmental conditions. Experiences encountered in these mass

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Prof. Fahnestock is Research Professor of Mechanical Engineering, University of Illinois; Mr. Heckel is a Consulting Mechanical Engineer, Chicago, and a member of HPAC's board of consulting and contributing editors; Dr. Glickman was formerly Assistant Professor of Medicine and Research Physiologist, University of Illinois; and Mr. Inouye is Research Assistant, Department of Medicine, University of Illinois.

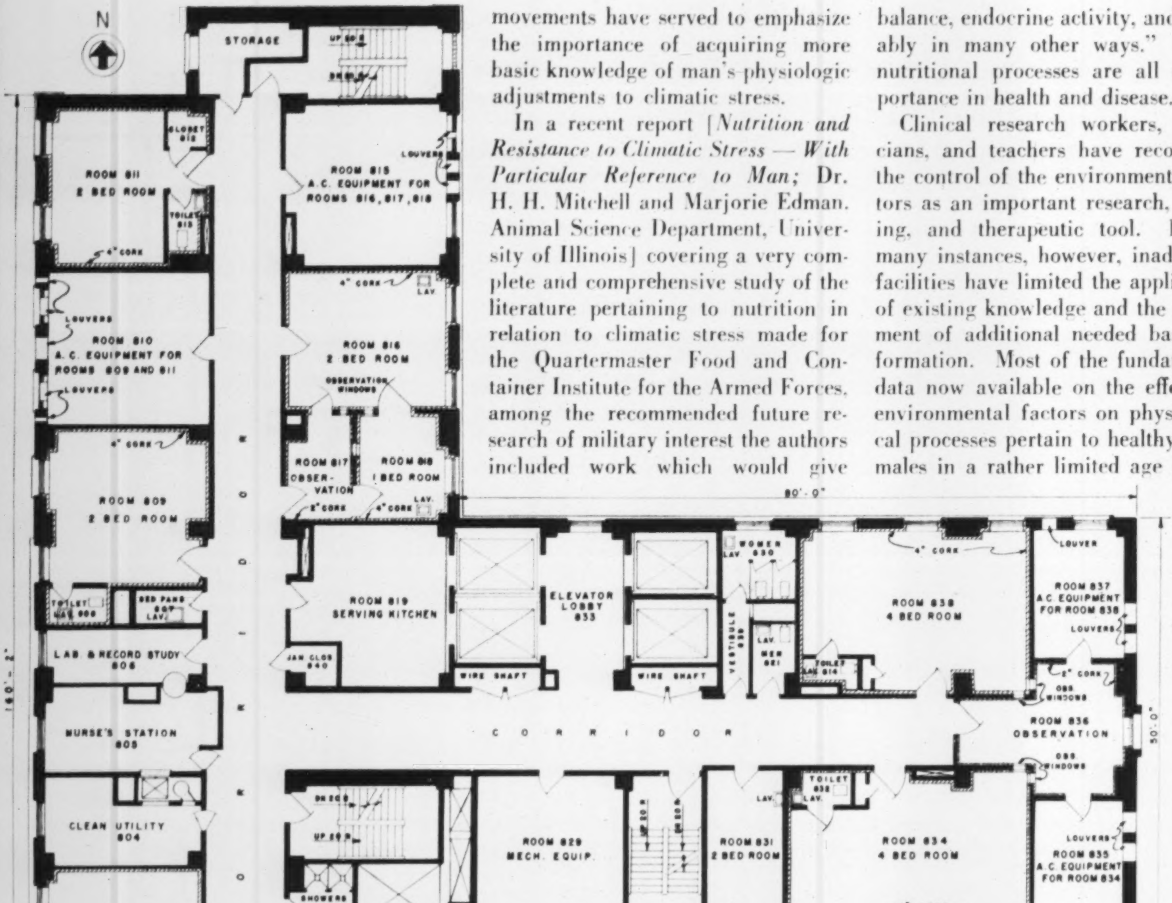

N
STORAGE
ROOM 811
2 BED ROOM
CLOSET 812
TOILET 813
4" CORK
LOUVERS
ROOM 810
A. C. EQUIPMENT FOR ROOMS 809 AND 811
LOUVERS
ROOM 809
2 BED ROOM
TOILET LAV. 808
BED PANS 807 LAV.
LAB. & RECORD STUDY 806
NURSE'S STATION 805
CLEAN UTILITY 804
ROOM 803
4 BED ROOM
LAV.
ROOM 802
A. C. EQUIPMENT FOR ROOMS 801 AND 803
ROOM 801
4 BED ROOM
ROOM 826
2 BED ROOM
50'-0"
160'-2"
CORRIDOR
ROOM 815
A.C. EQUIPMENT FOR ROOMS 816, 817, 818
ROOM 816
2 BED ROOM
OBSERVATION WINDOWS
ROOM 817
OBSERVATION
2" CORK
ROOM 818
1 BED ROOM
ROOM 819
SERVING KITCHEN
JAN CLOS 840
SHOWERS 822
REFRIG
ROOM 823
EXAMINING ROOM
BED PANS 826
ROOM 824
METABOLIC DIET KITCHEN
ROOM 825
2 BED ROOM
ROOM 827
A.C. EQUIPMENT FOR ROOMS 823 AND 825
LOUVER
80'-0"
ELEVATOR LOBBY 833
WIRE SHAFT
WOMEN 830
VESTIBULE 839
MEN 821
ROOM 838
4 BED ROOM
TOILET LAV. 814
ROOM 837
A.C. EQUIPMENT FOR ROOM 838
OBS WINDOWS
ROOM 836
OBSERVATION
50'-0"
ROOM 829
MECH. EQUIP.
ROOM 831
2 BED ROOM
TOILET 832
ROOM 834
4 BED ROOM
ROOM 835
A.C. EQUIPMENT FOR ROOM 834
TRIPLE THERMOPANE WINDOWS

FIG. 2—THE 8TH FLOOR ADDITION to the University of Illinois' hospital has eight special environment rooms with their adjoining equipment rooms, two instrument rooms, examing room and isolation room

movements have served to emphasize the importance of acquiring more basic knowledge of man's physiologic adjustments to climatic stress.

In a recent report [*Nutrition and Resistance to Climatic Stress — With Particular Reference to Man;* Dr. H. H. Mitchell and Marjorie Edman, Animal Science Department, University of Illinois] covering a very complete and comprehensive study of the literature pertaining to nutrition in relation to climatic stress made for the Quartermaster Food and Container Institute for the Armed Forces, among the recommended future research of military interest the authors included work which would give "Fundamental physiological information concerning the effect of diet under conditions of climatic stress on those organs and systems of the body most intimately concerned with tolerance to climatic stress, because of their functions in regulating the heat economy, the body temperature, and the transfer of oxygen from the atmosphere to the tissues. These systems are the pulmonary system, the cardiovascular system, the blood, and the skin representing the main area of contact between the body and its environment."

In a recent paper [*Physical Environment Control Essential in Nutrition Studies,* Heating, Piping & Air Conditioning, Vol. 22, No. 10, October 1950] Dr. Mitchell, one of the authors of the previously mentioned report, wrote "The factors of climate, temperature, humidity, air motion, air composition and pressure do modify the nutritional processes by modifying appetite, the body temperature, the heat economy, the water balance, endocrine activity, and probably in many other ways." These nutritional processes are all of importance in health and disease.

Clinical research workers, physicians, and teachers have recognized the control of the environmental factors as an important research, teaching, and therapeutic tool. In too many instances, however, inadequate facilities have limited the application of existing knowledge and the attainment of additional needed basic information. Most of the fundamental data now available on the effects of environmental factors on physiological processes pertain to healthy adult males in a rather limited age group. This should be extended to include children, aged persons, people subnormally constituted and ill people.

Early Studies at University of Illinois

For a number of years, many persons in the University of Illinois College of Medicine have, in one way or another, been intimately concerned with environment factors and their effects on well and sick people.

In the 1920's and early 1930's Dr. William F. Petersen, of the Department of Pathology, headed a group interested in teaching and research problems having to do with patients and the weather. Although he was seriously handicapped by the lack of physical facilities for controlled research, he gathered and published [*The Patient and the Weather;* Vol. 1, Parts I, II, 1938, 1936; Vol. IV, Parts I, II, III, 1937, 1937, 1938; William F. Petersen, M.D.; Edwards Brothers, Ann Arbor, Mich.] a large quantity of statistical information.

Dr. William F. Welker, of the Department of Biochemistry, and his associates in the allergy group, made notable contributions in the early 1930's in the alleviation of pollen hay fever and pollen asthma through air filtration and the regulation of temperature and humidity. Dr. Julius H. Hess, of the Department of Pediatrics, was interested in the 1920's and 1930's in air temperatures, humidity and air sterilization — particularly in connection with premature infants. Dr. E. Gellhorn and his associates worked on problems involving anoxia.

In the middle 1930's, Dr. Robert W. Keeton and some of his associates in the Department of Medicine, in cooperation with the American Society of Heating and Ventilating Engineers, initiated a study of man's physiologic adjustment to temperature and humidity. This work was expanded during World War II to include nutrition in relation to man's tolerance to and performance in extreme cold, the use of regulated temperature and humidity conditions as a control for year 'round post-operative convalescence studies, and for biochemical procedures.

The stimulus of government-sponsored research on climatic problems of the armed services during the 1940's resulted in a large increase in research activities and facilities involving physiological processes and environmental factors in the United States. Military aviation added new environmental factors — such as acceleration and explosive decompression. Facilities for controlling one or several environmental factors were set up in numerous military and civilian laboratories, but practically none of them were for clinical research with impaired or ill people.

By 1944, Dr. Keeton and his associates in the Colleges of Medicine, Agriculture, and Engineering were using six rooms in the university's hospital in which temperature and humidity could be regulated. These facilities provided for the control of temperature from −20 to 100 F and for relative humidity levels of from 20 to 80 percent. The results of the studies conducted in these rooms formed the basis for some 25 scientific papers and reports. In one paper [*Stress of the Physical Environment on the Normal Subject and the Sick Patient;* Dr. R. W. Keeton, Heating, Piping & Air Conditioning, Vol. 22, No. 12, December 1950] Dr. Keeton wrote: "In response to the ever-shifting viewpoints and techniques which the basic sciences are developing, medicine and its allied clinical disciplines have accepted the obligation to give human subjects, well and sick alike, the benefits of this newer knowledge. The physiologists have passed on much fundamental information derived from animal experimentation for trial on the human subject. The clinical investigators, in turn, have been confronted with problems posed by disease states which exist only in man and for the solution of which the techniques of physiology, biochemistry, and biophysics must be applied."

General Planning of Programs, Facilities

Concurrently, with Dr. Keeton as chairman, a committee considered the overall general needs of the Colleges of Medicine, Dentistry, and Pharmacy for the control of environmental factors in their research, teaching and therapeutic programs. A complete study of the current and projected activities included the following items:

1) A complete listing of the environmental factors involved in the various programs.

2) A breakdown of the factors involved in any one program, or in a group of related programs.

3) A careful consideration of the range of the individual factors needed in any one program or in groups of programs.

4) A careful consideration of the allowable variation in each factor for any preselected set value.

5) A careful consideration of the required rate of change of one or more factors in the various programs.

6) An evaluation of the projected programs from the standpoint of probable use of facilities; including the duration of individual tests, probable number of tests, the necessary continuity of tests, and whether the general character of the work warranted long- or short-term support.

7) An evaluation of the projected programs from the standpoint of the number and the sexes of the subjects involved.

All of this information was gathered, studied and evaluated — taking into consideration the engineering feasibility of the requirements, space requirements, convenience of location, accessibility to other facilities, interference with other functions, first cost and operating costs. For a number of reasons — of which costs and space requirements were major — it was obvious that like needs would have to be met by units of facilities. For example, if one group of workers required the control of temperature from 70 to 100 F, and a second group wanted to work with temperatures from 50 to 90 F, it was only logical to consider the possibility of designing and using one set-up to meet the needs of both groups.

The requirements of the experimenters and teachers largely determined the environmental factors to be controlled, the range and precision of their control, the continuity of control, and the size and number of the controlled spaces. This information formed the specifications by which the engineers and the architects could work. Coming at a time when plans for a major addition to the university's hospital were being developed, the engineers and architects were afforded the unusual opportunity of fitting the physical environment requirements into the overall planning. This permitted a compact, efficient arrangement of the controlled rooms and chambers into two general groups, each with its necessary mechanical equipment.

Group I included those facilities with inherent construction and mechanical characteristics which made them unsuitable for location on the intermediate floors of a hospital building, and Group II included those which offered no serious construction or operational problems on intermediate floors.

Group I Facilities of Special Construction

The maintenance of pressure above or below atmospheric in rooms or in sizable spaces involves heavy steel construction and extensive equipment. Subzero rooms require heavy, bulky, insulated construction and weighty refrigeration apparatus. The tentative layout of the constant temperature, humidity and pressure room shown in Fig. 1 illustrates a unit designed to control these environmental factors. Likewise, rooms for the maintenance of low and controlled noise levels involve ponderous construction and isolation features. It is these characteristics of unusual weight, large vertical space requirements, noise and vibration from

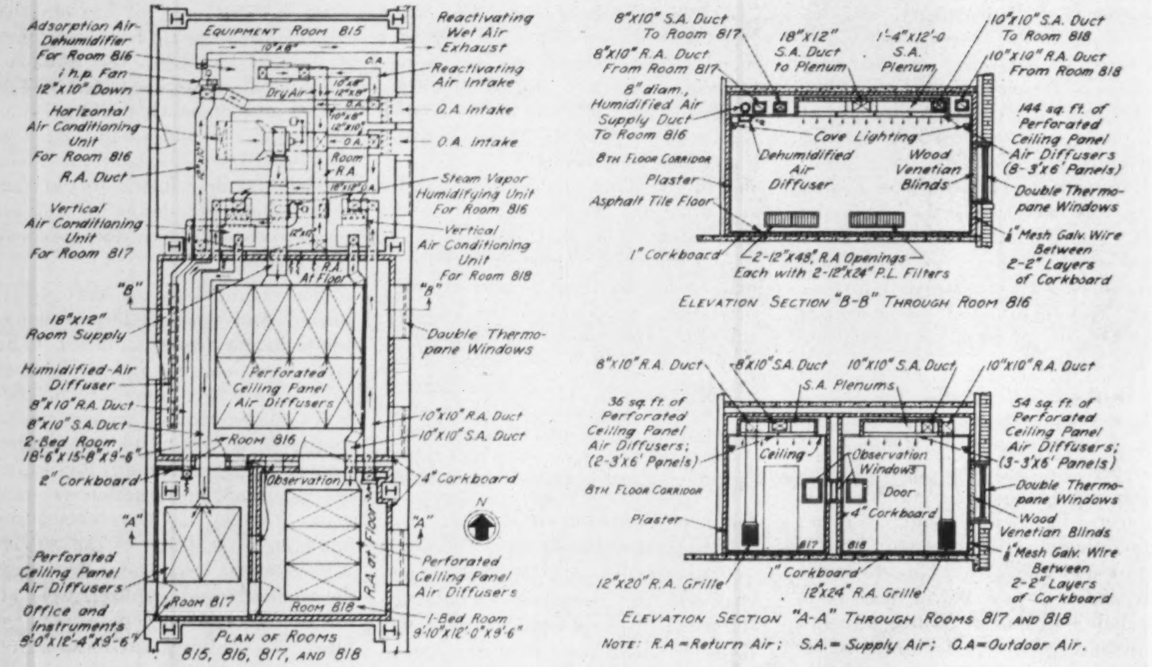

Equipment Room 815
Adsorption Air-Dehumidifier For Room 816
1 h.p. Fan
12"x10" Down
Horizontal Air Conditioning Unit For Room 816
R.A. Duct
Vertical Air Conditioning Unit For Room 817
"B"
18"x12" Room Supply
Humidified-Air Diffuser
8"x10" R.A. Duct
8"x10" S.A. Duct
2-Bed Room 18'-6"x15'-8"x9'-6"
2" Corkboard
"A"
Perforated Ceiling Panel Air Diffusers
Office and Instruments 9'-0"x12'-4"x9'-6"
Reactivating Wet Air Exhaust
Reactivating Air Intake
O.A. Intake
O.A. Intake
Steam Vapor Humidifying Unit For Room 816
Vertical Air Conditioning Unit For Room 818
"B"
Double Thermo-pane Windows
10"x10" R.A. Duct
10"x10" S.A. Duct
4" Corkboard
N
"A"
Perforated Ceiling Panel Air Diffusers
1-Bed Room 9'-10"x12'-0"x9'-6"
10"x8"
O.A.
Dry Air
10"x8"
12"x8"
O.A.
10"x8"
12"x10"
O.A.
Room R.A.
18"x12" O.A.
12"x10"
R.A. At Floor
Perforated Ceiling Panel Air Diffusers
Room 816
Observation
R.A. at Floor
Room 817
Room 818
Plan of Rooms 815, 816, 817, and 818
8"x10" S.A. Duct To Room 817
8"x10" R.A. Duct From Room 817
8" diam., Humidified Air Supply Duct To Room 816
8th Floor Corridor
Plaster
Asphalt Tile Floor
1" Corkboard
18"x12" S.A. Duct to Plenum
1'-4"x12'-0 S.A. Plenum
Cove Lighting
Dehumidified Air Diffuser
Wood Venetian Blinds
2-12"x48" R.A Openings Each with 2-12"x24" P.L. Filters
10"x10" S.A. Duct To Room 818
10"x10" R.A. Duct From Room 818
144 sq. ft. of Perforated Ceiling Panel Air Diffusers (8-3'x6' Panels)
Double Thermo-pane Windows
1/8" Mesh Galv. Wire Between 2-2" Layers of Corkboard
Elevation Section "B-B" Through Room 816
8"x10" R.A. Duct
8"x10" S.A. Duct
10"x10" S.A. Duct
10"x10" R.A. Duct
S.A. Plenums
36 sq. ft. of Perforated Ceiling Panel Air Diffusers; (2-3'x6' Panels)
8th Floor Corridor
Plaster
Ceiling
Observation Windows
Door
4" Corkboard
817
818
12"x20" R.A. Grille
1" Corkboard
12"x24" R.A. Grille
54 sq. ft. of Perforated Ceiling Panel Air Diffusers; (3-3'x6' Panels)
Double Thermo-pane Windows
Wood Venetian Blinds
1/8" Mesh Galv. Wire Between 2-2" Layers of Corkboard
Elevation Section "A-A" Through Rooms 817 and 818
Note: R.A = Return Air; S.A. = Supply Air; O.A = Outdoor Air.

FIG. 3—**PLAN AND ELEVATION SECTIONS** of rooms 815, 816, 817 and 818 showing typical arrangement of equipment, and typical location of equipment and observation rooms relative to the conditioned rooms

heavy reciprocating equipment, explosion hazards, mechanical servicing and large electric power, water and drainage services, which logically led to the conclusion to locate the following five major set-ups on the ground floor of a separate isolated section of the building:

1) The constant temperature, humidity, and pressure room.
2) The low- and high-pressure chamber.
3) The animal pressure-chamber assembly.
4) The constant temperature, humidity, and radiation room.
5) The quiet room.

This building has been completed. The constant temperature, humidity, and radiation room has been built, with the exception of the feature for controlling radiation, and two low-pressure chambers have been substituted for the originally planned low- and high-pressures chamber and the animal pressure-chamber assembly. No work has been done on the detailed engineering design and construction of the constant temperature, humidity and pressure room or on the design and construction of the quiet room.

In general, the Group II facilities — providing for the precision control of the environmental factors of temperature, humidity, air motion and air cleanliness — could be fitted into the general architecture of the 14 story hospital addition and conveniently located on the 8th floor in the medical section, with its accompanying nursing, medical, food and laboratory services. These services are absolutely necessary in the handling of human subjects or patients, regardless of whether the activities are devoted to teaching and/or research and/or therapy. Another important advantage of locating the rooms with special environmental control in the medical section of the hospital is that they can be used for routine hospitalization when not otherwise occupied.

Group II Facilities Fitted Into General Plan

A plan view of the 8th floor of the addition to the university's hospital is shown in Fig. 2. This shows the general arrangement of the eight special environment rooms with their adjoining equipment rooms, the two instrument rooms, the examining room and the isolation room. The latter four rooms are comfort air conditioned only. The floor also includes a metabolic diet kitchen, a nurses' station and other facilities needed on a general hospital floor.

In the architectural design of the special rooms, consideration was given to the character of the work which was to be done in them from the standpoint of length of test periods, continuity of exposure to given environmental conditions, rates of changes in exposures, pleasantness of surroundings, food and nursing service, toilet facilities, use of subjects of both sexes, and the environmental conditions to be maintained. In addition, the architectural design had to accommodate the unusually large space requirements of the special environment equipment, and its necessary location adjacent to the special rooms.

With reasonable occupancy, all of the special rooms are sufficiently large to provide space for the recreation features and the pleasant surroundings needed by confined subjects in long-term studies of an acclimatization type. Rooms 834 and 838 are designed for continuous long-term tests with, perhaps, male subjects in one room and female subjects in the other. Both are of the same size and each will comfortably accommodate from four to five persons. Rooms 809 and 811 are similarly designed, but are smaller in size. In the preliminary planning it was envisaged that they would be of considerable use to the allergy group, affording facilities for completely controlling the diet and activity of subjects in pollen-free air held at any level of temperature and humidity. Adjoining rooms 816 and 818 were designed for detailed short-term studies and studies having to do with exposures to rapid changes in temperature and humidity. These rooms and their instrument room are equipped with built-in electrostatic shielding to facilitate the use of electro-encephalographic and similar electrical pickup apparatus.

An Environment Room and Its Equipment

Fig. 3 is a plan view of rooms 815, 816, 817 and 818 along with elevation sections taken through room 816 and through rooms 817 and 818. In general, the construction of all of the eight special environment rooms is alike. All walls are insulated with 4 in. thick corkboard finished on the inside with cement plaster. The floors and ceilings are also insulated. The doors are of the refrigerator type and the windows are built of triple glass with inside wood venetian blinds. The purpose of the special construction is to reduce the refrigeration loads, to prevent moisture migration, to minimize condensation on exposed surfaces and to insure that the exposed surfaces in all of the rooms are approximately at the same temperature as the ambient air under all operating conditions.

The environmental conditions specified for room 816 are the same as those for rooms 801, 803, 809, 811, 834 and 838. They cover a range of temperature from 45 to 120 F, and a range of humidity from 20 to 80 percent at any dry bulb temperature. The permissible deviation in temperature is ±0.5 F, and that in relative humidity is ±2.0 percent. Similar rigid deviation requirements, but much smaller temperature and humidity ranges, apply to rooms 818 and 825, and comfort conditions of 74 F and 40 percent relative humidity are specified for rooms 817, 823 and 836.

In order to provide flexibility and to make each room condition independent of that in all other rooms, separate conditioning equipment is provided for each room. The air supply and return ducts between each environment room and the equipment serving it make it necessary to have the equipment rooms adjacent to the conditioned rooms. Refrigeration for each room is provided by chilled brine circulated from central brine chillers located in the basement along with the refrigeration compressors. This feature saves space on the hospital floor, gives better control, places the heavy reciprocating equipment in the basement, increases the efficiency of operation and reduces first and maintenance costs. Brine at 0 F is delivered to the equipment serving the environment rooms with minimum temperature requirements of 45 F, and at 38 F to the equipment serving the rooms with minimum temperatures of 74 F.

The plan view in Fig. 3 shows the essential pieces of equipment and air systems used for giving the range of temperature and humidity conditions in any of the special environment rooms. Referring to that portion of the plan view pertaining to room 816 and elevation section B-B through room 816, it will be seen that a typical assembly of equipment includes a horizontal air conditioning unit, an adsorption dehumidifier, and a steam vapor humidifying unit — all located in an adjoining equipment room.

The typical return air duct system to the horizontal air conditioning unit consists of large-area return openings near the floor and fitted with efficient filters, an outdoor air connection, and a connection to the dry air outlet of the adsorption dehumidifier. The conditioned air duct system to the room leads from the horizontal air conditioning unit to a large plenum which distributes the air uniformly through a very large area of perforated ceiling panel air diffusers. The special manner in which the air is removed and introduced into the room gives very low air movement (40 fpm or less) in the occupied zones of the room at all operating conditions.

The adsorption dehumidifier is required for the lower humidity conditions, and the steam vapor humidifier with its separate duct system and humidified air diffuser is required for the higher humidity conditions.

Chilled brine and steam are supplied to the horizontal air conditioning unit. In general, as the main supply of air for the room passes through the equipment, it is cooled and dried to values somewhat lower than those required for maintaining the pre-selected room conditions. The control of the dry bulb temperature is then attained with a modulating type of room thermostat actuating a reheat coil in the horizontal air conditioner. A modulating type of room hygrostat actuating a valve in the steam supply line to the steam vapor humidifying unit regulates the humidity.

The filtering of all of the outdoor air brought into the air system and of the return air as it leaves the room assures a room free of air-borne pollen and other solid foreign particles.

The less elaborate equipment and air duct systems shown for rooms 817 and 818 in Fig. 3 are also typical for rooms 823, 825 and 836. The air distribution, air cleanliness and precision of control in these rooms equals in quality that in the special environment rooms, but the controllable ranges of temperatures and humidities are considerably less.

Provide Unexcelled Opportunities

These special facilities for controlling environment factors and their strategic location in the research and educational hospitals of a large university afford unexcelled opportunities for carrying on basic clinical teaching, research and therapy programs involving environmental factors and physiological processes. They were made possible by the foresight and understanding of university administrators during some 10 years of planning, beginning about 1935, and through the patient, wise, and stimulating guidance given over the years by Dr. Robert W. Keeton, Professor of Medicine and Head of the Department of Medicine of the University of Illinois until his recent retirement.

[This article comprised a chapter in *Studies in Medicine*, a volume of papers in honor of Robert Wood Keeton, published by Charles C. Thomas, Springfield, Ill., 1951.]

New Wall Thickness Formula

. . . for high pressure, high temperature piping

A condensation of a "task force" ASME paper

EARLY IN 1951, the executive committee of the American Standards Association B31 sectional committee on the Code for Pressure Piping authorized the formation of a "task force" to try to resolve the differences in points of view on the criteria to be used in calculating the wall thickness required for high pressure steam piping. After considerable study and discussion, this task force recommended to the executive committee the formula given below.

This formula has now been approved by the power piping committee of the Code for Pressure Piping, and has been published in Mechanical Engineering (November 1952) as a proposed revision to the power boiler section of the American Society of Mechanical Engineers Boiler Code. The detailed work of this task force — and, in particular, the development of this formula — was presented at the 1952 annual meeting of the American Society of Mechanical Engineers in paper No. 52-A-151, *A Wall Thickness Formula for High Pressure, High Temperature Piping*, by W. R. Burrows, R. Michel and A. W. Rankin. The following presentation is a condensation:

The formula developed by the ASA B31 task force is:

$$t = (pD)/(2S + 2y\ p)$$

t = minimum thickness, p = internal pressure, D = outside diameter, S = code allowable S value.

In this formula, y is a temperature-dependent parameter with the following values:

Temperature, F	900 and below	950	1000	1050	1100	1150 and above
y, ferritic steels	0.4	0.5	0.7	0.7	0.7	0.7
y, austenitic steels	0.4	0.4	0.4	0.4	0.5	0.7

For values of y of 0.4, the foregoing formula reduces to the current ASME and ASA B31 Code formula (the modified Lame) for calculating the thickness of high pressure steam piping. To the minimum thickness t is to be added the current allowances for corrosion, threading, mill tolerance, etc.

The calculation of the stresses in pipe walls has been the subject of a great many papers during the last hundred years. In particular, piping has been a fertile field for the application of various theories of failure, and also for the application of theories of high temperature creep. The vast majority of these papers, however, have been of a mathematical nature only, and there are relatively few which have presented experimental test data on failure pressures — particularly at elevated steam temperatures.

Unfortunately, it is at the higher temperature levels — where only a few test data are available — that there is the greatest need for careful choice of pipe wall thickness. It is self-evident that here the wall thickness must be adequate to protect against wall bursting, but to obtain this protection by over-conservatism can itself lead to serious consequences.

At modern steam pressures, temperatures and mass flows, such over-conservatism can impose a severe economic burden, and, in addition, a too-heavy wall can adversely affect reliable operation due to the thermal stresses set up by temperature differences between the inner and outer wall surfaces during temperature transients. In navy and marine work, over-conservatism imposes a heavy penalty in the additional weight of piping which must be carried while for all installations the heavier piping results in difficult problems in expansion stresses which can themselves result in operational troubles if not solved correctly.

During the course of this investigation, a total of 31 formulas were considered. Most of these were taken from the technical literature but several were developed empirically during the investigation. The bases of these formulas ranged from the elastic-analysis results of Lame to the plastic stress configurations as given by the Beliaev-Sinitski formula and the creep-stress distributions of Bailey, Nadai and Soderberg.

Thirty-One Formulas Considered

A numerical evaluation was made of all 31 formulas by calculating the wall stresses given by each expression, at 1000 psi internal pressure, for D/t values ranging from 4 to 200. The degree to which the required wall thickness varies between the different formulas could be determined by this evaluation, while the allowable pressures for specific code S values and D/t ratios were also directly determinable. The relatively wide range in calculated stresses that is obtainable by these 31 published formulas was also evident from this study. At the lowest selected value of $D/t = 4$, the calculated stresses range from 1000 psi for the Common formula up to 2667 psi as obtained by the Guest formula. On the other end of the selected field, $D/t = 200$, the calculated stresses range from 107, 298 psi for the Meyer II formula down to 76,538 psi for the Average Shear expression. It will be recalled that these are all the calculated wall stresses at 1000 psi internal pressure; in all cases, the wall stress varies directly with the internal pressure.

The test data obtained by several investigators on the room temperature yielding and bursting of tubes were summarized in the recent paper by Blair [*Stresses in Tubes due to Internal Pressure*, by J. S. Blair, Engineering (London), September 15, 1950, page 218.] The results of the bursting tests have been replotted in Fig. 1, and from this it can be seen that a relatively wide range of D/t (outside pipe diameter/

wall thickness) was covered by these tests. The D/t ratio varies from approximately 50 down to 4.5, and this covers the range of values encountered normally in steam piping. A series of combined-stress experiments on tubes were conducted by Davis [*Yielding and Fracture of Medium Carbon Steel under Combined Stress*, by E. A. Davis, Trans. ASME, 1945, page A15], and the point from the Davis paper corresponding to the usual (approximate) piping stress configuration in which the axial stress is one-half the average tangential stress has also been replotted on Fig. 1.

Other test data on room temperature tests on tubes and pipes are available in the literature, but the results presented in Fig. 1 are sufficiently complete to furnish a reasonably sound basis for the continued use of the modified Lame formula for room and slightly elevated-temperature operation. Although the Average-Diameter formula and the Blair formula both furnish closer agreement with the test data than the modified Lame, neither differs from the latter by any significant degree, even for relatively heavy walled pipe. In particular, the slightly better correlation with the test data as obtained with the Average-Diameter and the Blair formulas is not sufficient to warrant discarding the modified Lame formula which has been used in engineering design for so many years.

At the higher operating temperatures of modern boilers and turbines, however, the only test data available are in the recent publication by Kooistra, Blaser and Tucker [*High Temperature Stress Rupture Testing of Tubular Specimens*, by L. F. Kooistra, R. V. Blaser, and J. T. Tucker, Jr., ASME Paper 51-A-44] which presented experimental results on pipe bursting at 850 F and 950 F; these data are reproduced in Figs. 2 and 3. While the latter paper is a valuable contribution to the technical literature on high temperature pipe bursting, the wall thicknesses used were too small relative to the diameter to be of unquestioned value in differentiating between various wall stress formulas. On Figs. 2 and 3, the bases of the arrows show the wall stress as calculated by the Common formula, which is simply the average tangential stress based on the in-

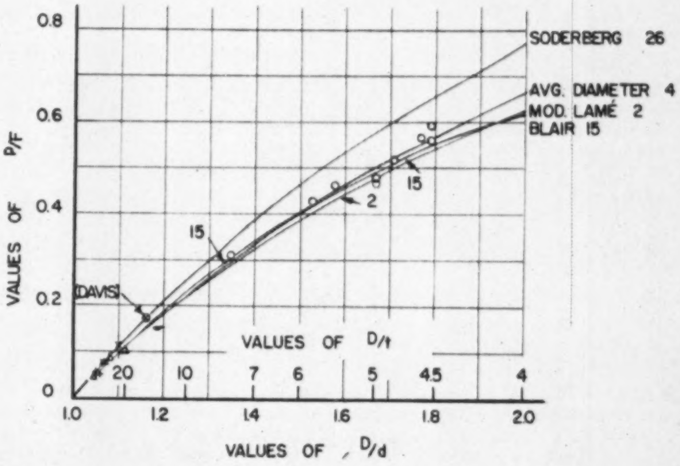


FIG. 1 — ROOM TEMPERATURE tubular bursting tests. Comparison of calculated stresses by Formulas 2, 4, 15, and 26 with test data of Blair and Davis. (d = inner diameter, D = outer diameter, F = ultimate strength, p' = internal pressure at bursting, t = wall thickness)

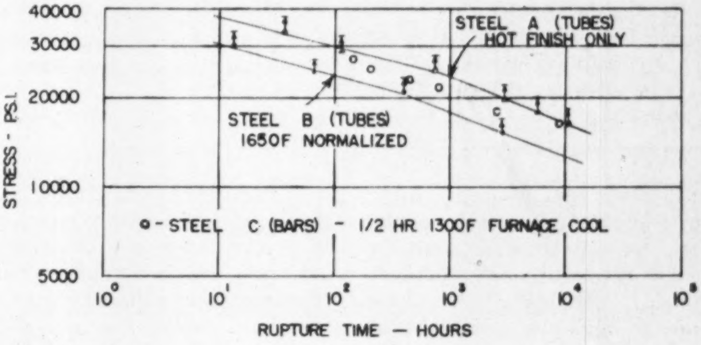


FIG. 2 — HIGH TEMPERATURE, 850 F, tubular stress-rupture tests on SA 210 tubes. Comparison of calculated stresses by Common formula (bases of arrows) and General formula (tips of arrows) with test data of Kooistra, Blaser, and Tucker.

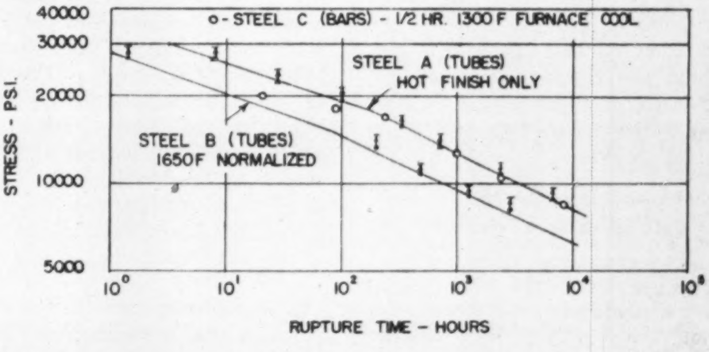


FIG. 3 — SAME AS Fig. 2, but at 950 F.

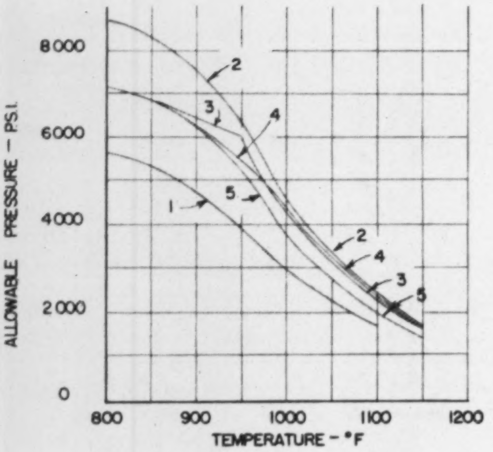


FIG. 4 — CALCULATED allowable internal pressures versus temperatures, for D/t = 5, by various formulas and allowable S values for 2¼% chromium 1 % molybdenum piping ASTM-213-T22.

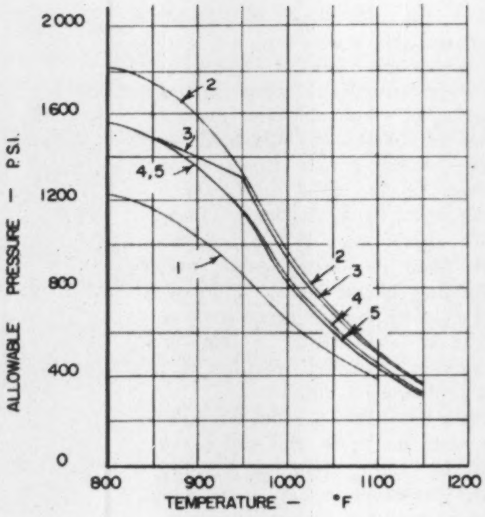


FIG. 5 — SAME AS Fig. 4, but at D/t = 20

1 = Code formula and allowable S values both as published in the Code for Pressure Piping, ASA B31.1-1951 (this formula is the same as the modified Lame 2)

2 = Soderberg formula and revised allowable S values as published in Mechanical Engineering, August 1951, page 676

3 = Burrows formula and revised allowable S values of 2 above

4 = General formula and revised allowable S values of 2 above

5 = Code formula of 1 above and revised allowable S values of 2 above

ternal pressure and inside pipe diameter, while the tips of the arrows show the wall stress as calculated by the proposed wall thickness formula. At 850 F, this latter formula duplicates the modified Lame, which is the tangential stress at the inside surface based on elastic stress analysis, while at 950 F the proposed formula differs from the modified Lame by only a small amount. The differences in calculated stress between the tips and bases of the arrows are too small to furnish an unequivocal justification for either of these two formulas, and accordingly these particular tests would also fail to differentiate unequivocally between most of the other wall thickness formulas considered in this study.

Development of the New Wall Thickness Formula

The test data summarized in Fig. 1 suffice to justify the continued use of the modified Lame formula for room and slightly elevated temperatures, but, in the elevated temperature regions, the paucity of adequate test data makes more difficult the selection of a satisfactory criterion of pipe wall thickness. The problems of creep and rupture here assume dominant roles, while the intercrystalline breaks which occur at high temperature render questionable the results of room temperature bursting tests.

Considering first the allowable creep in high temperature piping, it is a moot question whether such creep should be limited at the outer or inner pipe surface. If one is concerned about the actual diametral growth, the more important consideration should be at the outer surface, but if the maximum creep is deemed of greater importance, then it is the creep at the inner surface (at which point it is a maximum) which should be considered. The creep at the inner surface could be considered of fundamental importance as the initial indication of long-time rupture, but in this respect it is of questionable value because the elongation at rupture varies considerably between different alloys. It is here deemed more important to evaluate the creep at the outer pipe wall surface (where it can be measured if desired and at which point it could interfere with dimensional tolerances), and to obtain protection against rupture by utilizing a factor of safety on the extrapolated test rupture strength.

Many expressions have been published in the technical literature giving the equivalent creep stress at the inner and outer pipe wall surfaces, and a number of these were evaluated using representative values of the creep properties as obtained from published creep data. Following this numerical evaluation of the creep stresses, the problem of high temperature tubular rupture was considered. Assuming first the case of brittle fracture, there is considerable opinion that the average tensile stress across the pipe section is the dominating variable, although the evidence to support this is not conclusive. The average tensile stress is given by the Common formula, and to some degree this establishes a lower limit, for heavy walled pipe, since this formula gives the lowest stresses of all those considered. If, however, rupture in piping steels is dependent upon the radial and axial stresses as well as the dominating tangential stress (as is the case for the incidence of yielding), then the Soderberg formula

$$t = [(3)^{1/2}/2] \times (Dp)/\{2S + [(3)^{1/2}/2]p\}$$

offers a reasonably firm and logical basis. The Soderberg formula (which was developed to predict the incidence of yielding) is based on the utilization of the average elastic tangential, radial and axial stresses in the von Mises theory of failure, and although conclusive experimental evidence is lacking to prove the applicability of the von Mises theory of failure to long-time high temperature rupture, it is generally acceptable as a conservative approach. The Soderberg formula approximates the calculated stresses obtained by the various equivalent-creep expressions, and also shows satisfactory correlation with published tubular creep tests. A more detailed analysis of theoretical and experimental data as presented in the appendix of the ASME paper also gives numerical results closely duplicating those of the Soderberg formula.

The major objection to the Soderberg formula, however, is that, while at $D/t = 4$ it is approximately 30 percent conservative with respect to the Common formula, it gives lower calculated stresses than the Common formula for D/t values greater than approximately 10. Because of the paucity of high temperature tubular bursting tests, it was not deemed advisable to recommend any formula which would give thinner pipe walls than the Common formula. In addition, of course, it was desired to continue with the use of the modified Lame formula at room and slightly elevated temperatures on the basis of the available data on room temperature tubular bursting tests. Accordingly, consideration was given to modifications of the Soderberg formula by which acceptable results for high temperature thin walled piping would be obtained and the modified Lame formula would result for room and slightly elevated temperatures.

With these goals in mind, the General formula was developed empirically, and basically this is a double formula with a temperature-dependent parameter. At elevated temperatures, this formula duplicates the Soderberg formula for heavy walled pipe, and with it also a number of the creep-stress expressions, but will not give thinner walls than the Common formula for the lighter schedules. At room and slightly elevated temperature, the General formula reduces to the modified Lame expression, which is the current code formula. The General formula accordingly approximates satisfactorily the available room-temperature tubular bursting data, agrees reasonably well with the various creep-stress expressions for high temperature operation, duplicates for high temperature heavy walled pipe the Soderberg formula and its theoretical considerations of yielding, creep and high temperature rupture as well as the alternative theoretical approach given in the appendix to the ASME paper, and reduces to both the Common and modified Lame formulas for thin walled piping.

Inasmuch as the expression to which the General formula reduces at high temperature will give lower calculated stresses for any given D/t ratio than the corresponding formula obtained at low temperatures, the transition zone in which the temperature-dependent parameter y varies must be selected with careful consideration of the code allowable S values. If the transition zone were placed in a temperature region in which the code S values did not decrease sufficiently rapidly, an anomalous situation would result in which the permissible pressure at a given temperature, for a particular wall thickness, would be greater than the permissible pressure, for the same wall thickness, at some lower temperature.

It is for this reason that the temperature-dependent parameter y differs between the ferritic and austenitic steels. The temperature ranges in which the transition is effected between the low temperature formula and the high temperature formula have been selected by consideration of the code S values for the ferritic and austenitic steels. In particular, these transition ranges have been so selected that, with the current code S values, the anomalous situation described above regarding permissible pressures will not occur.

Figs. 4 and 5 have been prepared to illustrate the relation of the proposed General formula to the current Code formula and other expressions for calculating pipe wall thickness. These curves show the allowable pressures versus temperature, for D/t values of 5 and 20, as evaluated in terms of both the former and the current code S values for 2¼ percent chromium, 1 percent molybdenum piping, ASTM-213-T22. The formulas selected for comparison, together with the allowable S values for each expression, are as follows:

1) Code formula and allowable S values as published in the Code for Pressure Piping, ASA B31.1-1951. (This formula is the same as the modified Lame).

2) Soderberg formula and revised allowable S values as published in Mechanical Engineering, August 1951, page 676.

3) Burrows formula and revised allowable S values of 2 above.

4) General formula and revised allowable S values of 2 above.

5) Code formula of 1 above and revised allowable S values of 2 above.

The Burrows formula is

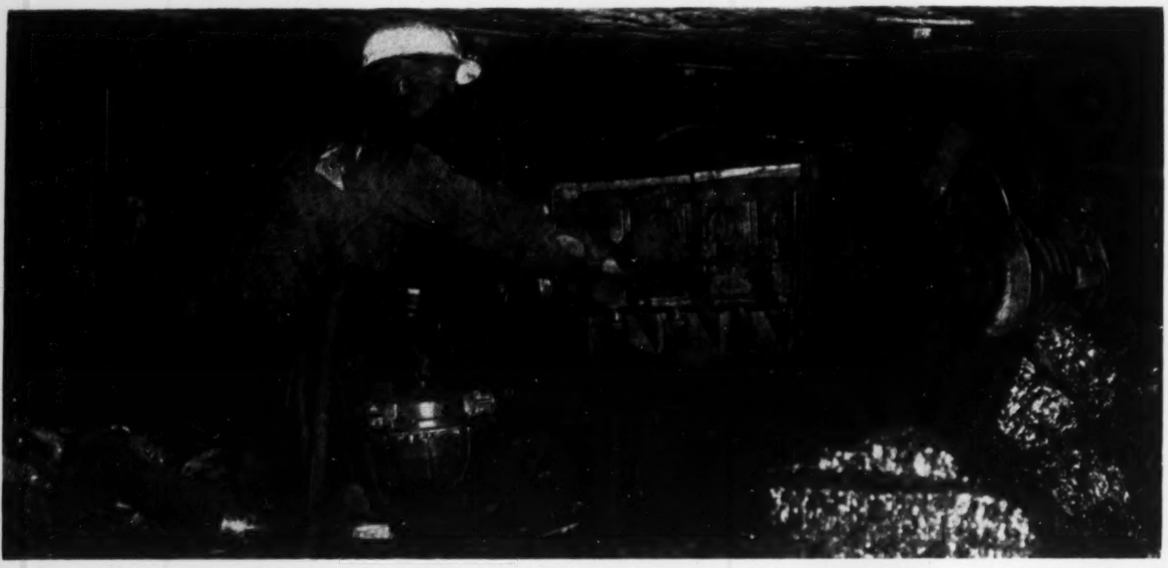
$$t = (Dp)/(2KS + 0.8\,p)$$

with $K = 1.00$ for 850 F and below, $K = 1.03$ for 900 F, and $K = 1.15$ for 950 F and higher.

For $K = 1.00$, this expression is the same as the current Code formula (the modified Lame) and approximates the result obtained assuming plastic stress distribution and the maximum shear criterion of failure; for $K = 1.15$, this expression is the same as the current Code formula divided by 1.15, and as such approximates the result obtained assuming plastic stress distribution and the modified energy criterion of failure.

Figs. 4 and 5 illustrate how the General formula duplicates the current Code formula up to 900 F, but permits higher allowable pressures at the higher temperatures. The additional pressure allowed by the General formula over the Code expression is greater for the heavy wall pipe (Fig. 4) than for the lighter schedules (Fig. 5). The curves marked 1 and 5 indicate the increased allowable pressures permitted by the revised code allowable stresses alone, while the curve marked 4 shows the further increase in allowable pressure due to the General formula.

[Mr. Burrows is Assistant Chief Engineer, Whiting Refinery, Standard Oil Co. (Indiana), Mr. Michel is Head Engineer, Scientific and Performance Section, Bureau of Ships, Navy Dept., and Mr. Rankin is Assistant Division Engineer, Large Steam Turbine Engineering Div., General Electric Co.]



MECHANIZATION IN MINING coal has only recently supplanted in a significant way the laborious methods that have prevailed down through the centuries. (Bureau of Mines photo)

The Fuel Situation

HPAC's annual round-up of where we stand now, what developments are underway, how the future looks

By Kalman Steiner

PERHAPS ONE OF the most spectacular developments — of the many that fuel technology has brought forth in recent years — is the mechanization of the ancient art of coal mining. Few persons realize the antiquity of coal mining. Coal was mined in Greece as early as 400 B.C., and in China even earlier. At the time of the Roman conquest coal was already in extensive use in Britain, and the coal mining industry has been important to its economy ever since.

Exploitation of coal resources in the United States began very late, due to the abundance of our wood supply. In 1814 this country produced 22 tons of anthracite coal, but in the city of London by that time over 120 miles of pipe had been laid to distribute coal gas. The earliest records on bituminous coal show that American production totaled 300 tons in 1820. But by 20 years later, annual production of both hard and soft coal had passed the million ton mark for each. We now mine coal at the rate of about one-half billion tons per year, but only recently has mechanization supplanted in a significant way the laborious methods that have prevailed down the centuries.

Mechanization a Significant Development

Mechanical cutting, loading and moving of coal in the mine accomplishes a number of important objectives. It permits working thinner veins, eliminates or minimizes use of explosives, reduces labor cost — probably the most important. In a recent study it was revealed that in one case mechanical mining and loading resulted in a labor cost of between 30c and 40c per ton of coal delivered to main line, in 1952, with a base labor rate of over $17 for 7 hr at the working face. Contrast this with data of 30 years ago — labor cost for loading the mine car only of 35.2c per ton, with a base labor rate of $5.60 for 8 hr at the working face. This striking contrast is made possible by continuous mechanical mining equipment.

In brief, mechanical apparatus is now available for removing the coal from the mine bed at the working face, loading it onto a conveyor belt or into mechanically propelled cars, and elevating it to the surface. At

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Mr. Steiner, of C. Hoffberger Co., Baltimore, is a member of HPAC's board of consulting and contributing editors. He has written widely on fuels and fuel burners from a background of much practical experience and careful study. In recent years, he has summarized the fuel situation in each January issue of HPAC.

the surface, of course, additional machinery takes the coal through the cleaning, sorting and loading operations that finally leaves it in the railroad car ready for movement to the consumer. To return to the coal face again, in the mine, the Bureau of Mines describes a coal planer (plow) that increases by about 50 percent the average of 8.5 tons of coal per man shift in mines already using mechanical conveyors. (Report of Investigation 4922).

Charring of Coal and Lignite

The past year has seen extension of interest and activity in the charring of coal and lignite. The first major sized project was announced last year — an aluminum plant in Texas to utilize lignite char, to have an ultimate daily consumption rate of 8000 tons of lignite. Now, thought is given to the charring of bituminous coals, of all types and classes, for the purpose of obtaining a char fuel free of volatile constituents to be used in firing boilers, a supply of coal gas for use as fuel, and a variety of chemical byproducts.

Canadian Crude a Noteworthy Development

In petroleum, perhaps the most noteworthy feature of the year's developments is the remarkable progress made in building up Canadian crude production. The two provinces of Alberta and Saskatchewan have a combined daily production of 150,000 bbl and are expected to reach 250,000 bbl daily in the near future. Most of this oil runs through pipe lines to the Great Lakes for transshipment by tanker. At Superior, Wis., there is a large storage terminal. Important quantities also move to the Pacific coast, via pipe line to Vancouver, thence by tanker to United States ports, serving to relieve demands upon American west coast production. The Vancouver pipe line is now being extended across the border and will deliver crude to a new refinery now being erected in Washington state on Puget Sound — the first full scale, modern refinery in the northwest. The refinery will have a capacity of 35,000 bbl per day; it will cost about $35 million, and the pipe line extension another $2.75 million.

In the United States, newest important crude discoveries have been in the Williston basin of North Dakota and east Montana, and in west Texas around Kent county. The latter constitutes a large discovery, but recovery will be difficult because of local geology.

The Tidelands Oil Resources

Much has been said in the press and in the recent election campaign about the tidelands oil resources, and who owns or controls them. The Supreme Court has held that the paramount interest in the oil discovered beneath these submerged lands is vested in all the people of the United States. Yet apparently it still lies within the discretion of Congress to legislate control of certain pools to the states within whose boundaries the pools may lie, and tremendous pressure is being exerted by lobbies to induce such legislation. The advocates of state control point out that all existing oil production is under such control at present, that well recognized practices and policies exist under such state control, and that to now establish federal control over important oil pools will introduce certain confusion — if not worse — into the production of vital crude oil.

About all this article can contribute is perhaps a clarification of certain concepts involved. The term *tidelands* itself should not be applied to the bulk of the oil reserves under dispute. Tideland is shore that is exposed at low tide and submerged at high tide. Such land indisputably belongs to the state and no contest exists pertaining to it. So also does land under inland waters, including bays, rivers, lakes, etc. (Federal control applies only to navigation in such waters). The only land in issue is land under the marginal sea — from low water mark out to the traditional three mile limit. On two occasions the Supreme Court has ruled — in the California case in 1947 and the Louisiana case in 1950 — that the states have not title and that only the United States has to petroleum or any other resource under the marginal sea. Furthermore, the continental shelf extends beyond the three mile limit for varying distances into the surrounding sea — up to 250 miles from shore. President Truman in 1945 asserted by proclamation that the mineral resources of the continental shelf are subject to the control and jurisdiction of the United States.

It can be expected that legislation will be introducted in the new Congress intended to transfer title to either or both marginal sea and continental shelf mineral resources. Such a measure, including reassertion of states' rights to tidelands and inland waters, was vetoed by President Truman last May. In his veto message, Mr. Truman wrote "If the Congress wishes to enact legislation confirming the states in the ownership of what is already theirs — that is, the lands and resources under navigable inland waters and the tidelands — I shall, of course, be glad to approve it. But such legislation is completely unnecessary, and bears no relation whatever to the question of what should be done with lands which the states do not now own — that is, the lands under the open sea." As matters stand today, neither the states nor the Federal government can grant leases, with any authority, to oil companies interested in drilling the marginal sea. Secretary of the Interior Chapman has extended such leases already in existence on which drilling has been started in submerged Gulf Coast lands prior to December 11, 1950. But new Federal legislation is necessary — either to declare that the government is withdrawing its claims in favor of the states, or establishing channels by which exploitation can begin under Federal management.

What of Our Future Oil Supply?

Just how important the submerged oil deposits become remains to be established, but very likely the offshore wells when drilled will contribute materially to our crude oil production. The overall picture of supply meeting demand in this country continues unsettled, but oilmen seem to share the viewpoint — expressed at the November American Petroleum Institute meeting in Chicago by John E. Sweringen, general manager of production, and John W. Boatwright, general manager of distribution economics, Standard Oil Co. (Indiana) — that the domestic oil industry will find enough oil in the next 15 years to meet foreseeable demands and, barring a major war with virtually complete cessation of imports, the industry will have a comfortable margin of producing capacity over requirements.

They predict a production rate in the year 1967 of about 8 million bbl crude per day and of 1.1 million bbl natural gasoline per day for a total of 9.1 million bbl per day, or an increase of about 33 percent over present rates. Further, they predict for that time a reserve in producing capacity of 1.9 million bbl per day or 21 percent of daily production, as compared with about 0.9 million bbl per day now. For total figures, including imports, they give 11.8 million bbl per day estimated supplies and total demand of 9.9 million bbl per day including exports of finished products, providing an estimated margin of supply over demand of 1.9 million bbl per day.

Developments in Bulk Liquid Fuel Storage

Some interesting developments in bulk liquid fuel storage were announced during the year. Several American companies are investigating the possibilities in the Swedish method of storing oil and products underground, either in natural or man-made caves, using water level to seal cracks and crevices. Such storage requires little steel, has a low operational cost, and is especially safe from bombing attack. It is said also to be practical in areas subject to earthquake. The Armed Services petroleum purchasing agency has awarded a contract for experimental underground storage of 60,000 gal of jet fuel in a Kansas salt cavern. Liquefied petroleum gas (LPG) is already being stored extensively in underground caves and caverns, principally those resulting from salt deposits. Unfortunately, such storage occurs near producing centers rather than near consuming centers. It is now considered likely that underground storage will be constructed, probably by a number of distributors working in cooperation, since the unit cost is much lower in large capacities.

The gas turbine is worth a moment's attention. The impeller of a gas turbine is turned by hot gases generated in the combustion chamber or combustor, obviating need for the intermediate boiler in the case of steam propelled engines. The Shell Petroleum Co., in England, has announced that it is building an 18,000 ton oil tanker to be driven by gas turbines — twin units developing 8300 brake hp. Last year the same company equipped a 12,000 ton tanker with part-gas turbine propulsion. The railroads of America have an extensive development program underway to apply gas turbines to locomotives. One transcontinental road has had one oil fired, gas turbine propelled, locomotive on test runs for two years and now is putting ten more into service. Two or three other roads are trying it out also. The coal burning gas turbine locomotive also has been under intensive development for a number of years, burning pulverized coal. The primary problems with the latter are the removal of larger sizes of fly ash from the gas, and obtaining complete combustion, before the gases enter the turbine.

Meanwhile dieselization is cutting more deeply into railroad hauling. All the 250 high speed streamliners of the country are now diesel drawn. After some years of success with passenger service, the railroads decided to try the diesel in freight service, and the program is now much advanced. During the year ending August 31, 1952, the railroads installed 3346 diesel electric locomotives. This was on top of 3464 installed in the preceding 12 months. In the first seven months of 1952, diesels handled nearly 65 percent of all freight service, more than 70 percent of all passenger service, and more than 75 percent of all yard and switching service. More than 97 percent of the locomotives that produced this service have been bought since 1940; and more than 82 percent since the end of World war II. The number of steam locomotives in use declined from 56,936 in 1929 to 17,401 on September 1, 1952; the number of diesels in use increased in the same period from 22 to 19,758.

What of Other Natural Resources?

On June 23, 1952, the President's Materials Policy Commission submitted its five volume report entitled *Resources for Freedom.* Headed by William S. Paley, and known as the Paley commission, this group had made a comprehensive survey of all materials produced and used in the country, from the viewpoint of predicting the country's position with regard to these materials over the next 25 years. The opening paragraph of the last chapter of Vol. I says "One thing seems certain about the materials problem: it will persist. Its forms will alter; its severities may be controlled, and partial solutions will brightly present themselves — but the forces that brought the problem into being will increase rather than diminish. The central fact seems unalterable: as industrial civilizations grow in complexity they compound the demands made upon materials. . ."

The Paley report of course included an analysis of petroleum and natural gas reserves and called for judicious governmental and industry steps in providing most efficient use during the next 25 years. Our petroleum outlook is no cause for immediate concern, but eventually will dwindle and become inadequate. Imports of both crude and refined product by 1975 will be greater than now. Synthetic oil, probably first from shale and then from coal, will come into commercial production within 10 years — perhaps sooner. It foresees a total increase in demand for petroleum products of 168 percent between 1950 and 1975, from about 10 million bbl per day to about 27, and concludes that the free world's liquid fuel resources can support this tremendous increase.

From time to time various other experts and authorities have issued estimates as to the remaining length of time that the several fossil fuels will last. Fossil fuels include coal, oil and natural gas. Such estimates of course must be based upon a great number of assumptions: known deposits, probable new discoveries, present rates of consumption per capita, and of course increases both in population and in consumption per capita. Based on present rates of consumption per capita and on the world's present population, Fieldner has estimated that known reserves of fossil fuel will last 654 years. But the present rates of increase of population and of consumption per capita reduce this estimate to perhaps 100 years. So regardless of what the actual number of years might be, we know that fossil deposits are finite and cannot last forever. What comes after that?

Is Nuclear Energy the Answer?

The eyes of the scientific and technical worlds have turned to nuclear energy, seeking the answer to the long range energy source. Since the end of World War II investigation of nuclear fission has been pushed intensely. Not too much has been made public; and probably the major part of the work has been devoted to national security and applications of nuclear energy to armament. Still, a considerable progress has been made toward commercial exploitation of this new energy source. About a dozen firms are now engaged in joint, cooperative investigations with the Atomic Energy Commission. Probably the actual commercial application is still many years in the future, but by the same token the realization can be expected long before fossil fuels become scarce.

All the known reserves of fossil fuels are equivalent to about 80 × 10^{18} Btu (10 percent represented by oil, oil shale and natural gas, and 90 percent by coal and lignite). A single pound of uranium undergoing fission releases 3.5 × 10^{10} Btu. Known world resources of fissionable material amount to 25 million tons of uranium and 1 million tons of thorium. In all, the fissionable materials represent a potential energy reserve twenty-three times as great as the fossil fuels. This estimate assumes only commercially available deposits, at a cost of production not exceeding $100 per lb (which is three to four times present day costs).

Nuclear fission of course conveys to the public mind the concept of the atomic bomb. An atomic bomb is an uncontrolled release of atomic (more accurately, nuclear) energy, with the instantaneous release of enormous quantities of energy and the attainment of tremendously high temperatures. Commercial applications of this energy source require its controlled release, at such rates and in such manner that the more moderate temperatures familiar to industry will permit conversion to conventional forms of heat and power.

The apparatus used for conducting this controlled fission is known as a reactor. The fuel used in a reactor is some form of substance that will split its atomic nucleus or undergo fission under the influence of a bombardment of neutrons. Neutrons themselves result from the fission of other nuclei. The reactor construction makes it possible to control the bombardment by means of moderators or neutron absorbers.

TO INSERT NEW URANIUM FUEL slugs, operators remove a 5 ft long plug from a pile at an Atomic Energy Commission installation

Finally, there must be a method of cooling. The entire system of course must be enclosed in a suitable shield to prevent uncontrolled escape of radiation. One conceivable application of a reactor to useful power would be a system embodying a reactor and a gas turbine, whereby air would be pumped first through the reactor to be heated and then through the turbine to propel it. The shaft of the gas turbine would of course drive a generator or other mechanism capable of delivering useful power.

The extent of the present activities of the Atomic Energy Commission may be judged from the facts that its existing plants consume an annual total of 2,800,000 tons of coal, chiefly to generate power. However, the extensions of existing plants, and the construction of additional plants, already authorized and provided for in appropriations, will so broaden the scope of AEC activities that its combined facilities after completion of these extensions and additions will require the combustion of 22,500,000 tons of coal annually.

The author makes grateful acknowledgement of assistance in the preparation and review of this article by Dr. W. C. Schroeder and associates at the Bureau of Mines, and to others who have extended invaluable aid.

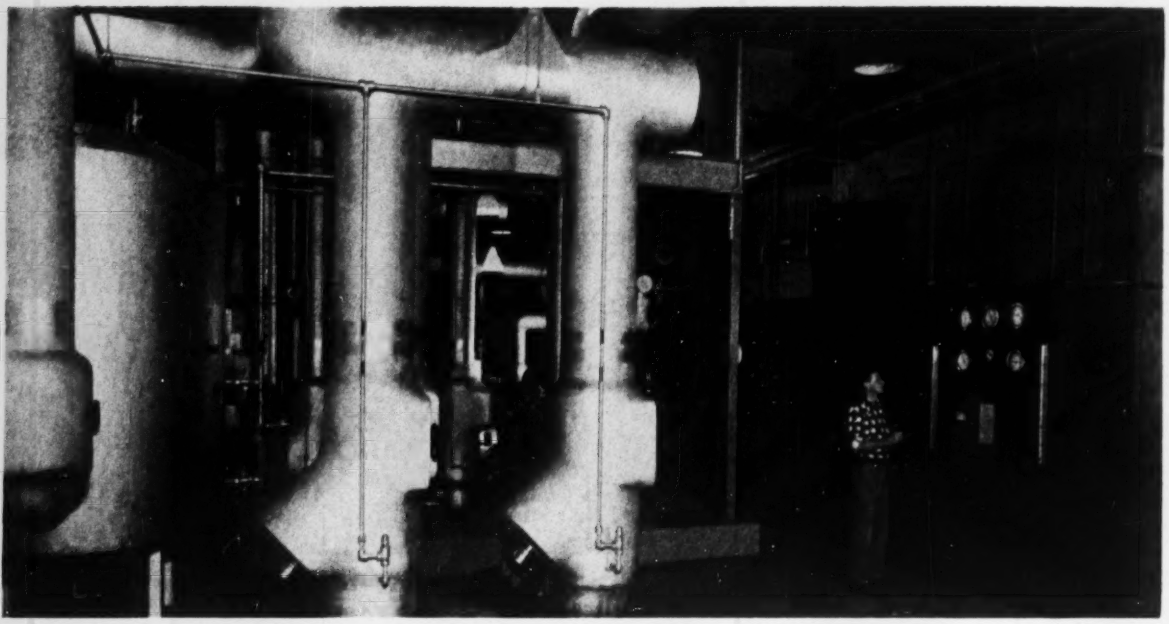
[A second article will discuss progress in synthetic fuels, and coal as a chemical raw material.]

U.S. MUST BOOST PRODUCTIVITY

INDUSTRIAL PRODUCTIVITY must increase 45 percent within the next 10 years if the United States is to maintain a balanced, expanding economy, according to Frank R. Benedict, industrial products engineering executive of the Westinghouse Electric Corp.

This increased productivity can be achieved only by more intensive application of new technological developments throughout industry. The need for this increase, he maintains, is brought about by the "insistent demand for a constantly improving standard of living by a steadily increasing population."

In the face of a serious shortage of scientists, development, and design engineers, industry must meet this challenge for increased productivity. A major problem in applying new technological development is that of completely coordinating development of products with development of tools to manufacture them.



FIFTY REMOTE TEMPERATURE readings may be taken on the control panel at the right. This brine equipment is used to condition a large controlled temperature compartment

Good Operation, Maintenance

. . . . are assured by the program followed at the Naval Ordnance Laboratory for the air conditioning and refrigeration systems

By Charles E. Mandley

Quarterman in Charge
Refrigeration and Air Conditioning
U.S. Naval Ordnance Laboratory
White Oak, Md.

Air conditioning and refrigeration installations are assuming an ever increasing role in the nation's defense plants and research laboratories. As one of the largest ordnance research and development centers in the world, the Naval Ordnance Laboratory at White Oak, Md. uses some of the finest and most unique refrigeration equipment in existence anywhere.

Refrigeration requirements at NOL include variable climatic control applications for test purposes, comfort air conditioning of large and small buildings, brine cooling for dehumidification, applications to aeroballistics research, and very low temperature requirements for both large and small testing facilities. In addition, necessary space areas precisely conditioned to constant temperature and humidity are needed year in and year out.

4000 Tons of Refrigeration

Such needs require approximately 4000 tons of refrigeration of a highly complex and varied nature because of unusual conditions. As in many large plants, refrigeration is also used for cold storage facilities (both domestic and commercial), water coolers and central drinking water systems.

Comfort air conditioning, moreover, is an important part of the refrigeration plant because a large percentage of the occupied buildings have year 'round air conditioning needs. NOL's air conditioning equipment varies in size from $\frac{1}{2}$ ton units for single rooms to large 17-fan zone systems with more than 2000 pneumatic controls — in addition to centrifugal refrigeration compressors of 800 tons each.

Beyond the usual comfort air conditioning requirements, atmosphere conditioning necessary to technical research is accomplished by two centrifugal refrigeration compressors of 350 tons capacity, driven by motors with hydraulic coupling speed control. These compressors are capable of chilling calcium chloride brine to temperatures below freezing, as called for in the aeroballistic research areas. In these areas, very large spaces must be maintained at a constant temperature of plus or minus ½ F over indefinite periods of time.

Other refrigeration units consist of climatic control cabinets and low temperature boxes ranging in size from small test compartments to those large enough to accommodate larger ordnance components — such as mines, torpedoes and depth charges.

Needless to say, any low temperature and climatic control system requires an extensive network of staged compression units, including necessary intercoolers, desuperheaters and their controls. One such system uses three comparatively large reciprocating compressors in a cascade arrangement whereby the discharge of one compressor enters the suction of the other, and so on. This particular system is a direct expansion one, using "Freon 22" as the refrigerant with solenoid expansion valves controlled by remote high side float switches. A further NOL system employs a combination of centrifugal and reciprocating compressors with necessary staging, intercooling and float switches. In the latter system, "Freon 12" is used as the direct refrigerant and methylene chloride is used as the indirect refrigerant, with nitrogen gas being utilized to maintain a predetermined pressure within the indirect cooling system. Moreover, refrigeration is used in conjunction with reheat steam controls in this system to maintain constant humidity at temperatures above 40 F.

On-the-Job Training for Operators

Because of the diversified combinations of refrigeration, climatic control and air conditioning employed in facilities at NOL, it is very difficult to hire mechanics with appropriate previous experience. Therefore the use of an "on-the-job" training program is mandatory. Moreover, careful selection of mechanics, with an eye to their past experience and apparent aptitude for training, is an important hiring consideration.

Once hired, the mechanic is assigned to the job for which his experience has shown he is best qualified. After a few months on this initial assignment, he begins a rotation through other job areas to become proficient in operating the laboratory's large centrifugal machinery, climatic control devices and air conditioning systems. He must further learn maintenance and repair of all types of refrigeration and air conditioning equipment. Since the operation of most of the large equipment requires two operators, the new mechanic can operate with the senior operator, thus reducing the cost of his training to a minimum.

After his period of job rotation, the new mechanic is assigned to the job for which he has demonstrated the best aptitude. This rotation training meets three very important objectives: (a) the assurance of a constant supply of experienced mechanics in the operation and maintenance of facilities; (b) proper placement of mechanics into the jobs in which they will assure capable performance; and (c) versatility and depth in complement skills.

Approximately two years ago, an apprentice training program was started in the refrigeration and air conditioning shop which will eventually supply a source of well-trained mechanics, proficient in their trade and in the particular skills for our requirements. Like all naval apprentice programs, NOL's program consists of an intensive four year course which includes more than 1800 hr of classroom instruction in mathematics, mechanical drawing, science, English, civics and elementary supervisory development. These subjects comprise the curriculum which is related to shop problems and geared to the cultivation of good character and leadership qualities.

How Maintenance Is Organized

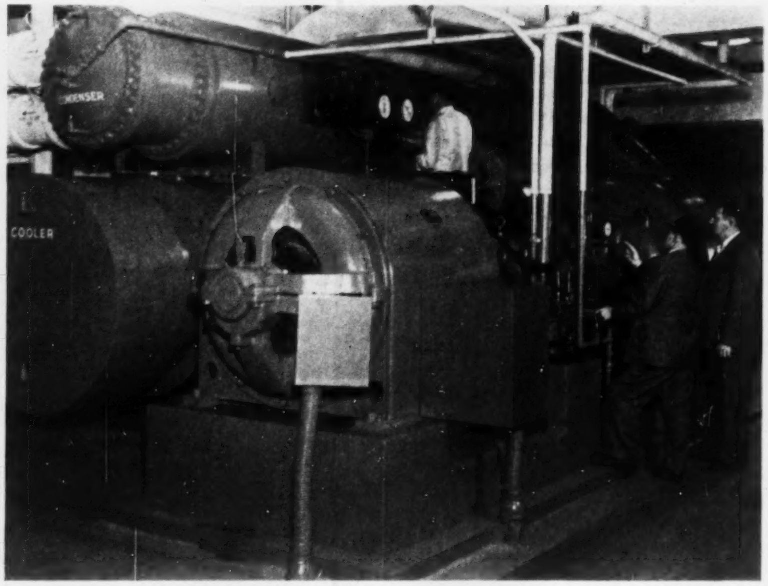
The maintenance of equipment and buildings is of course a very important problem in the successful operation of such facilities as those at NOL. The laboratory's public works department is responsible for all maintenance disposition, including transportation, fire protection, shop repair and construction work. The refrigeration and air conditioning shop is an important unit in the maintenance shop. Air conditioning and refrigeration problems — like all utility troubles — are controlled from a central desk located in the maintenance shop office. A ticket specifying the time, date, location, name of caller and exact trouble is made up in this office. Upon receiving a trouble call, qualified mechanics are assigned to the utility failure. When the trouble has been eliminated, the repair time is noted on the ticket and the ticket is returned to the central office.

Trouble calls are held to a minimum by a program of constant inspection and preventive maintenance. This program employs a maintenance emergency and inspection crew, including a refrigeration and air conditioning group which is on duty 24 hr a day. All refrigeration and air conditioning equipment that runs 24 hr a day is checked and inspected by the group on each shift, and trouble —or potential trouble — is remedied. Any breakdown which cannot be immediately taken care of is logged in

NAVAL ORDNANCE LABORATORY

The Naval Ordnance Laboratory, in White Oak, Md. — about 12 miles from downtown Washington, D. C. — is the Navy's newest and one of the country's largest and finest ordnance research and development centers. Established in 1946 at its present location, the laboratory's 873 acres and 100-odd buildings house many millions of dollars in equipment — much of which is unique in its kind. The laboratory was originally set up in 1918 to carry on the kind of ordnance experimentation which is so very necessary to keeping the nation prepared, yet which private industry seldom finds economically feasible to perform in peacetime.

The laboratory is further unique in that its teams of scientists and engineers carry out both pure and applied research in nearly all phases of electronics, acoustics, optics, magnetism and chemistry. Among the unusual facilities at White Oak are the famous supersonic wind tunnels and ballistics ranges, the "anechoic" or echo-free room, and the environmental testing laboratory, where ordnance may be subjected to the kind of pressures, temperatures and shocks which might be found in field conditions encountered anywhere on the face of the earth.



PRECISE LOG READINGS and accurate records are "musts" on this 800 ton refrigeration compressor used for air conditioning

a running log which is reviewed after each shift for appropriate action. In the case of very important equipment, full effort toward immediate emergency repairs is directed at once.

"Personal History" Cards for Equipment

Each piece of equipment has a "personal history" card on which repairs, inspection and other data are recorded. These history file cards are referred to when ordering spare parts, for example. Consideration is always given to priority importance of equipment requirements, local stock availability, scarcity of stock materials, delivery dates and cost.

The file cards are kept in the refrigeration and air conditioning shop. This shop employs a total of 40 men. Its personnel make-up includes two supervisors and two apprentice mechanics. The work load is almost evenly divided between operation and maintenance.

General Outline of Maintenance Procedures

Maintenance operation at NOL is similar to that in other installations of equal size. Smaller equipment — such as water coolers, domestic refrigerators and window air conditioners — is brought into the shop, repaired and overhauled there. Most of the equipment, however, is maintained away from the shop in machine rooms and other locations. Periodic preventive maintenance is performed during shutdown periods whenever possible. Preventive maintenance schedules are also planned in advance. As elsewhere, preventive maintenance of machinery begins with proper lubrication; hence lubrication schedules are rigidly followed and precise records are kept by the lubrication section of the maintenance department.

The following items are included in NOL's schedule of preventive maintenance performed at least once a year:

1) Inspection of electrical motors for check on cleaning needs, bearing troubles and complete overhaul advisability.

2) Checking out of all large electrical panel starting apparatus.

3) Cleaning of all heat exchange equipment, such as coolers, oil temperature regulators, condensers and water towers.

4) Adjustment of coupling alignment on large machinery and pumps.

5) Repacking and performance checking of pumps.

6) Overhauling of valves, traps and strainers.

7) Checking of bearing clearances on large machinery.

8) Renewal of pulleys, sheaves and belts when necessary.

9) Performance efficiency checking of refrigeration compressors.

10) Changing of oil in large compressors and gear boxes.

11) Drainage of water from all exposed piping and coils to protect against freezing.

12) Calibration and checking of safety controls and control equipment.

Control Maintenance Particularly Important

A further phase of the program is the maintenance of automatic controls. There are several thousand pneumatic controls, in addition to the electrical type, which are used on the larger air conditioning and refrigeration systems. Since controls are a vital part of machinery operation and represent a comparatively large cost item, preventive maintenance and repair is particularly important.

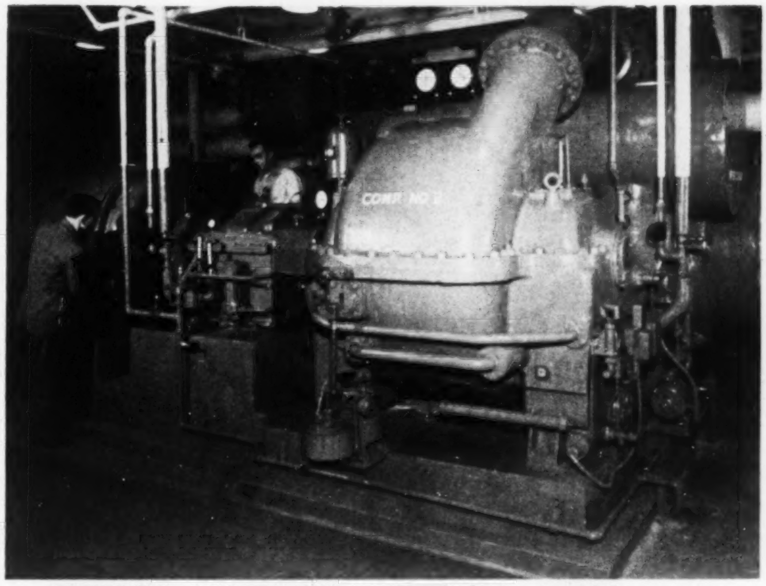
A primary preventive measure is the insurance that all air supply lines to such controls are clean and dry. This is accomplished by the use of proper filters and by daily inspection of moisture accumulation facilities. Another important preventive measure is the periodic inspection of pneumatic valve packings to control brine, steam or water leakage into the exposed parts of the diaphragm to prevent deterioration.

Pneumatic controls are removed and tested on a test board located in the main machine room. The operation of thermostats, relays, valves and damper motors can be tested by simulation of the actual conditions under which they are used. To enable the shop to keep on hand a stock of calibrated controls for replacement of defective controls, a complete rebuilding and calibration program is carried out.

Operating Large Refrigerating Equipment

The operation of equipment used for air conditioning, refrigeration and precise climatic control applications at NOL follows standard procedure in the case of large and expensive equipment. Whenever large refrigeration machinery is operating, hourly readings are logged which record bearing temperatures, oil pressures, suction and discharge pressures and temperatures, brine temperatures, outside air temperatures, compressor speeds and motor amperages. Operators are trained to observe constantly such safety indicators as oil and refrigerant levels, pump operations, valve positions, float indications, vibrations, unusual sounds, safety control lights and alarms.

Multistage low temperature refrigeration operators are also instructed to be on the alert for proper desuperheating between stages of compres-



PREVENTIVE MAINTENANCE pays big dividends. A quick but accurate check is being taken of the bearing temperature on an 800 hp motor

sion. Combinations of temperature and humidity requirements often necessitate the use of steam and refrigeration together — a use which requires the operators to check additional controls and recorders.

Air conditioning operation, with the exception of refrigeration equipment in the main machine room, consists in logging readings periodically. These readings include occasional static pressure checks for air filter replacement in addition to precise 2 hr checks on return air temperatures, supply air temperatures, outside air temperatures and temperatures of brine supply and return at cooling coils. Log sheets of these latter readings are diagnosed for indications of equipment scale deposits on cooling coils, clogged strainers and frozen or faulty valves and controls. All log sheets are filed for future reference in aiding the determination of overall plant efficiency.

Safety Stressed At All Times

Throughout all operation and maintenance work, safety is stressed at all times. Safety need is particularly pointed up by NOL's use of high voltage electricity and compressor impellers which turn at speeds up to 5000 rpm. However, as in all machine room operations, safety in shop practices and machinery maintenance is rigorously observed. Thirty-minute safety talks are periodically given by the supervisor. Safety reminders, posters, graphs and pamphlets, are displayed and distributed throughout the plant. The safety engineer's office at NOL furnishes any needed assistance in safety education and procurement of safety equipment. Safety glasses are issued to all mechanics, while other safety equipment is made available as needed. NOL has an excellent safety record, of which it is justly proud.

A beneficial suggestion program at NOL encourages and rewards suggestions which result in reduction of operational safety hazards as well as in the promoting of general laboratory efficiency. The suggestion program, however, is only a small part of local management's sincere effort to recognize the maximum potential of every employee. Full recognition of the importance of people from the "front office" makes it possible to operate and maintain our refrigeration and air-conditioning facilities at maximum output. Certainly, sound maintenance, skillfully practiced by well-trained mechanics, is the ultimate key to successful, efficient and economic employment of NOL's research and development facilities.

IBR Discusses Summer Cooling

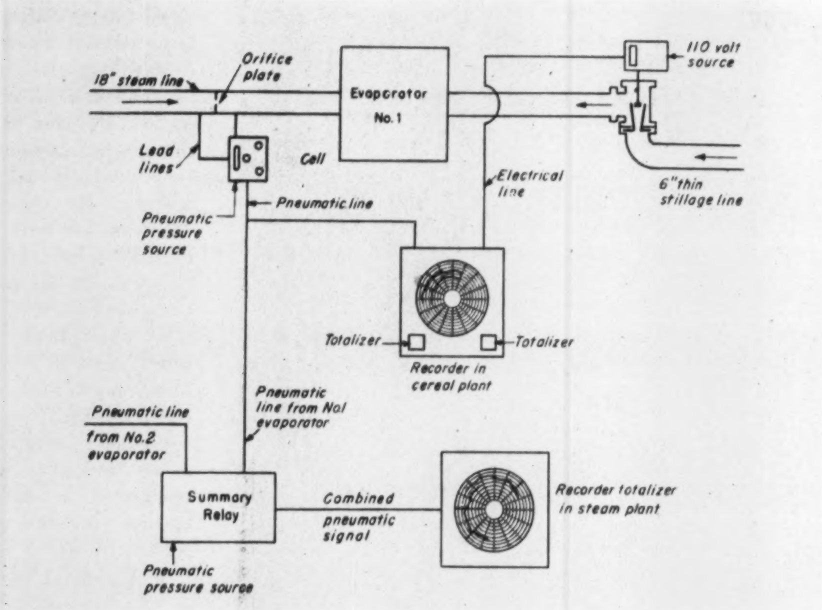
SUMMER COOLING in connection with hot water and steam heating was one of the subjects discussed at the 1952 semi-annual meeting of the Institute of Boiler and Radiator Manufacturers. "Avenues are being opened" by which the "benefit of the maximum comfort available from hot water and steam heating systems as well as the advantages of summer cooling" can be obtained, it was disclosed at the meeting.

Wesley J. Peoples, IBR's chairman, announced that the attendance at the meeting was the largest in the history of the institute. A total of 103 representatives of manufacturers of hot water and steam heating equipment and accessories from the United States and Canada participated in the three-day discussions of research, promotion and market expansion.

In the course of a general discussion of current business conditions, in which all members voiced their opinions, the consensus was that the hot water and steam heating industry can look forward to a "wholesome and substantial year."

Members of the institute were brought up-to-date on the research program at the University of Illinois in a report by Warren Harris, research associate professor. He said the program has concentrated on panel heating and on studies on effective heat. A study of the heating effect of radiators, convectors and baseboards under actual operating conditions is being made. Six different types of units are being investigated; so far, the work on three units has been completed and it was found that all three had identical fuel consumption.

The subject of summer cooling in connection with hot water and steam heating systems was presented by Peter Gordon, chairman of the panel heating committee of the American Society of Heating and Ventilating Engineers, by Professor Harris, and by various members of the IBR research committee.


18" steam line
Orifice plate
Evaporator No. 1
110 volt source
Lead lines
Cell
Electrical line
6" thin stillage line
Pneumatic line
Pneumatic pressure source
Totalizer
Totalizer
Recorder in cereal plant
Pneumatic line from No.2 evaporator
Pneumatic line from No1 evaporator
Summary Relay
Combined pneumatic signal
Recorder totalizer in steam plant
Pneumatic pressure source

FLOW CHART showing the metering and recording instrumentation at Hiram Walker distillery. Meters on the steam and stillage lines transmit their signals to the same recording chart, so that the optimum 1 to 3 flow balance can be checked visually. In addition, the steam rates of both evaporators are totalized pneumatically and the total rate of flow is shown on a recorder in the steam plant

New Flow Meters Save Steam

..... and improve cost accounting at Hiram Walker distillery

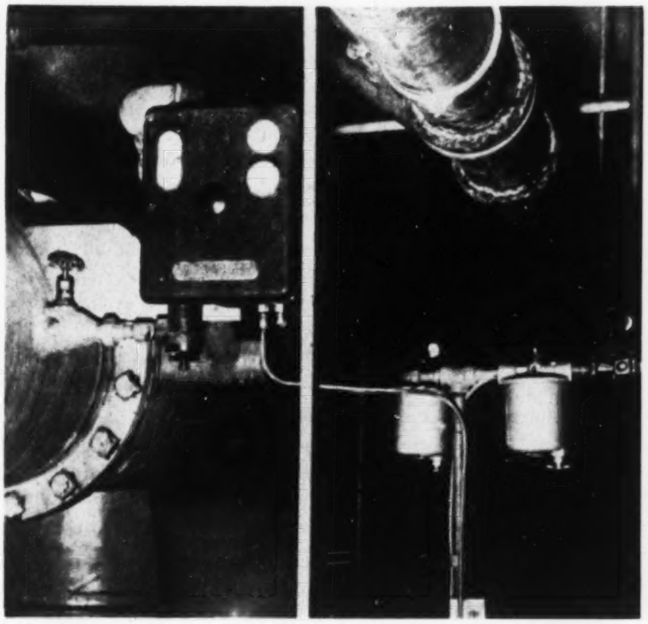
By William I. Bingaman and Robert E. Johnson

Manager, Cereal Products Div., Hiram Walker and Sons, Inc., and Chicago District Manager, Fischer & Porter Co., respectively

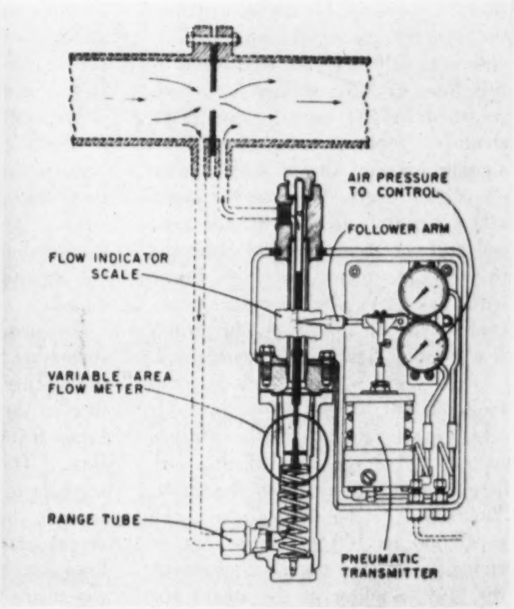
A NEW FLOW METER installation at the Hiram Walker distillery, Peoria, Ill., solves problems which — in essence — are found in many process industries. The installation makes efficient use of steam and cuts power costs in the processing of stillage residue into livestock feed. The same meters solve the internal cost accounting problem of correctly charging the appropriate department for the process steam used.

The installation is further interesting because it is an early application of a new type of orifice meter. The new instrument, used at the distillery to measure steam flow, meters the bypass flow around an orifice plate. The instrument is a small variable area flow meter whose float assumes a position in a tapered metering tube depending on the flow rate of the bypass stream.

The float incorporates small magnets that couple it, without drag, to the magnetized yoke of a follower arm which, in turn, actuates a pneu-



ONE OF THE variable area cells which meters the steam passing through the 18 in. steam lines to the evaporators, where much of the water in the thin stillage is evaporated



VARIABLE AREA CELL flow meter meters a continuous bypass flow around an orifice plate. Linkage to signal transmitter is magnetic

matic transmitter to remotely-situated receiving instruments. This magnetic linkage eliminates the need for a stuffing box.

Because the bypass flow is proportional to the main flow and the variable area metering element has an inherent linear response to flow, linear scale readings are obtained at the point of measurement and at remote receivers. Also inherent in the meter is a 10 to 1 metering rangeability that provides a convenient size scale for widely varying flow rates.

Meters Aid Process Control, Save Steam

The function of the variable area cell in the production of livestock feed from stillage is shown in the accompanying flow diagram. The processing steps are as follows:

In the production of whiskey, mills grind the incoming grain into meal. Water added to the meal forms a mash which is cooked to bring the starch in the grain into solution. Malt is then added and the malt enzyme changes the grain starch into sugar. Yeast is added, which ferments the mash, converting the grain sugars into spirits or whiskey. When the fermentation period is completed, the mash is pumped into the top of the distilling column. Steam enters at the bottom. As it rises, its heat vaporizes the alcohol in the mash. The vapors travel upward, while the nutritious residue gradually moves down toward the bottom of the still, where it is removed as stillage.

The stillage is pumped to the cereal products plant where, after screening and centrifuging, it enters one of the two sets of triple evaporators, which are operating continuously. Steam metered by the variable area cells enters each of the first effects of the evaporators through 18 in. lines, passing around heat exchange tubes that reduce the moisture content of the stillage. Following the evaporation of most of the water, the stillage is further processed by steam driers into feed products.

The flow of thin stillage, whose solids content ranges from 2.45 to 2.80 percent, is measured by meters installed in each of the two 6 in. lines extending between the storage tanks and the evaporators. The thin sillage meter sleeves and "T" sections, which are 8 in. in diameter and adapted down to the 6 in. pipes, can handle a flow range of 30,000 to 300,000 lb per hr. These meters for measuring the thin stillage flow — which are designed principally for metering solids-carrying liquids — are also designed on the variable area metering principle. The entire flow passes through the tapered stainless steel sleeve, supporting the metering float at a position which indicates the flow rate. An improved self-balancing impedance bridge is employed to transmit float positions to the recording instrument (110 volts a-c).

Because these meter measurements are linear, it is desirable that steam metering also be linear, so that stillage and steam flows can be compared on the same recording chart. The variable area cells installed on the 18 in. steam lines do this.

For maximum processing efficiency, an optimum balance must be maintained between the flow rates of steam and thin stillage entering the evaporator. If too much steam is used, heat will be wasted and costs will be unnecessarily high. If too little steam is used, the thin stillage will not be evaporated fast enough for the two evaporators to keep up with the huge output of the stills. For all stillage flow rates, the ratio of steam to stillage is maintained at 1 to 3. Since the thin stillage usually enters the evaporator at the rate of 150,000 lb per hr, optimum balance requires approximately 50,000 lb per hr of steam.

The 1 to 3 ratio of steam to thin stillage is kept constant by manually adjusting the steam flow to stillage flow. To simplify this adjustment, the signals transmitted from the variable area cell and the meter measuring flow of thin stillage are both recorded by the same receiving instrument. Separate pens record these signals on one linear scale, polar coordinate chart. Because the pneumatic signal from the variable area cell and the electric signal from the thin stillage meter are both linear with the flows they measure, concentric curves appear on the graph if a constant flow ratio is maintained.

The chart is calibrated to read from 30,000 to 300,000 lb per hr, which is the range of the thin stillage meter. Average flow of thin stillage is about midscale on the chart. The range of the variable area cell is 10,000 to 100,000 lb per hr of steam. To find the flow of steam, the scale reading of the steam pen is simply divided by three, and the comparative readings can easily be made. Thus, keeping the proper relationship between stillage input and steam input is a simple graphic operation. A totalizer in the receiver indicates the amount of steam and stillage consumed by the evaporator. Two such receivers, one for each of the evaporators, are installed in the cereal products plant.

Before the installation of the cell in the steam line, a cost accounting problem was created by ineffective instrumentation. The steam plant metered and totalized all steam flows except those going to the evaporators in the cereal plant. The accounting department then charged the cereal products plant with the difference between the total steam generated and that charged to the other departments. No relation existed between the volume of steam consumed and the amount of feed products produced.

To provide conveniently the information needed for correct cost accounting, a separate recorder-totalizer in the steam plant totalizes the total steam flow to the two evaporators. The pneumatic signals to this instrument originate with the feeder lines to the two-pen recorders in the cereal plant. Air from the feeder lines (at 3 to 15 psi, depending on the steam flow rate) goes to a pneumatic adding relay. The relay adds the pressure of the two lines and transmits a signal (at 3 to 15 psi), which represents the instantaneous sum of steam flow to evaporators.

The totalizer mechanically integrates the relay signal and records the running total on a linear scale circular chart.

The stainless steel construction of the sleeve and metering float makes the new meter impervious to the acidity of the stillage. No meter maintenance has been required.

"HIT 'EM WHERE AND WHEN THEY AIN'T"

HOW DOES A HOTEL air condition its rooms without the guests even being aware that anything unusual is happening? The answer is to "hit 'em where and when they ain't," according to the Carrier Corp.

It was decided to put all central equipment for a 296 room year 'round air conditioning system on the roof of Atlanta's Biltmore hotel, 12 stories above the street, where no one would see it or know it was going into place.

It was made easy by using a 330 ton absorption refrigerating machine which chills water with steam, is light in weight and has no moving parts.

Then a careful check was made of the "house count" or room occupancy cycle during the past few years. It was discovered that there was a low point in August and another in December.

As the August low approached, the hotel booked guests into one wing while workmen went into the other and began sliding small diameter conduit for conditioned air from the roof down through vertical tiers of rooms. In December, they went again into empty rooms, put the room units in place, and hitched them to the conduit.

Puncture Theories of Construction's Instability

WIDELY-HELD THEORIES concerning the construction industry's instability and its relationship to "the boom-bust swings of the whole economy" are punctured in a comprehensive research study issued last month by the Committee for Economic Development.

Among the general beliefs challenged by the findings of Miles Colean and Robinson Newcomb in their new book, *Stabilizing Construction: the Record and Potential*, are:

1) That the construction industry is subject to 18 to 20 year cycles of depression-precipitating declines. Their analysis suggests there is no such cycle.

2) That a serious postwar decline, such as those which followed the Civil War and World War I, is inevitable. Their study indicates that with public and private development of economic policies such as those advanced by CED, construction volume can remain at high levels through the foreseeable future, without the threat of a collapse like that of 1932.

3) That public works can be counted on as a quick and effective means of offsetting drastic declines in the construction industry and the economy as a whole, in the absence of greater long-term planning, budgeting and coordination of federal, state and local programs. Messrs. Newcomb and Colean detail the problems of timing and managing a contra-cyclical public works program and offer specific recommendations for overcoming them.

4) That the violent swings in construction activity trigger off broader economic fluctuations. Their study shows the industry is more victim than villain, that it fluctuates less than some other major segments of the economy, and that falling demand for some forms of construction is frequently offset by rising demand for others.

5) That restrictive practices by employers, workers and government have given the intended beneficiaries real protection against wide shifts in demand, supply, prices, wages and employment. In the authors' opinion, such practices have failed of their purpose, with some temporary exceptions, and have actually prevented the industry's growth to its proper potential and contributed to its instability.

Over 300 Attend ASME Session on Air Pollution Control

THE FUELS AND power divisions of the American Society of Mechanical Engineers devoted a session of the ASME annual meeting in New York last month to a discussion of different aspects of air pollution and its control. The meeting was attended by more than 300 people.

The subjects discussed were:

Recent Developments and Progress in Air Pollution Abatement, by Allen D. Brandt, Chief Industrial Hygiene Engineer, Bethlehem Steel Co., Bethlehem, Pa.

The Hygienic Significance of Air Pollution, by Robert A. Kehoe, Director of Dept. of Preventive Medicine and Industrial Health, College of Medicine, University of Cincinnati.

Air Pollution Indicated by Symptoms on Vegetation, by P. W. Zimmerman, Plant Physiologist, Boyce Thompson Institute for Plant Research, Inc., Yonkers, N. Y.

Some Legal Aspects of Air Pollution Abatement, by Frank L. Seamans, of Smith, Buchanan, Ingersoll, Rodewald & Eckert, Pittsburgh.

Stack Diffusion, by E. Wendell Hewson, Director, Diffusion Project, Round Hill Field Station, Massachusetts Institute of Technology, South Dartmouth, Mass.

Engineering and Management Viewpoint of Air Pollution, by George F. Jenkins, Supervisor of Design, Carbide & Carbon Chemicals Co., Div. of Union Carbide & Carbon Corp., So. Charleston, W. Va.

Sampling and Measurement, by Leslie Silverman, Associate Professor of Industrial Hygiene, Harvard University, School of Public Health, Boston.

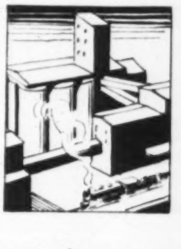
Industrial Experience in Fly Ash Collection, by Bert S. Norling, Power Design Engineer, E. I. DuPont de Nemours & Co., Inc., Wilmington, Dela.

The first speaker presented a brief summary of the entire subject, including some data on the degree of air pollution existing in several localities. Control of pollution received more attention than any of the other aspects of air pollution. The important characteristics of dust and gas collectors were outlined briefly.

Lack Knowledge of Pollution's Effects

Dr. Kehoe emphasized the great lack of knowledge as to the effects of usual air pollution on the health of the exposed population. Acute effects brought on by unusual air pollution, such as the Donora incident, are beyond doubt, but whether the usual air pollution increases the incidence and severity of respiratory illness among exposed inhabitants has not been established. Much research is needed. Standards for comfort and welfare must be developed before a meaningful appraisal of the problem can be made.

Dr. Zimmerman pointed out that there are some common air pollutants which have an adverse effect on selected vegetation in trace concentrations. It is not necessary that the pollutant cause outright and complete destruction of the plant to constitute a problem. Discoloration of the leaves, decreased rate of growth and other effects are sufficient to call attention to the need for air pollution control. While SO_2 is usually thought of as the most important danger to vegetation, many plants are so much more sensitive to fluorine as to make its presence in the air even in concentrations in the order of parts per billion dangerous to certain plants.



Mr. Seamans was unable to be present at the meeting. His paper was summarized by the session chairman. The importance of having industry take part in preparing ordinances and writing legislation was stressed. Since industry has the greatest stake in the problem, it follows that industry must take an active part in the solution.

The very great influence of meteorology on dispersion and rapid dilution of stack effluents was emphasized by Mr. Hewson. If weather conditions are such that turbulence and turn over do not exist on a large scale, the effluents from what normally would be wholly unobjectionable stacks will build up to high concentrations at or near ground level in a relatively short time. Meteorological data are not being used to full advantage in air pollution control, he said.

Mr. Jenkins stated that community relations are so precious to industry that it cannot afford to ignore air pollution control. The problem is a huge technological one, but there is evidence at present to show conclusively that management and engineers alike are beginning to face the challenge. Invention and development were advanced as the proper course toward a solution — not legislation and regulation.

Even though there is little in the way of "standard methods" for sampling and measuring air pollution, Professor Silverman feels that the many techniques employed routinely by industrial hygienists can be applied satisfactorily to the measurement of air pollution. There is a need for narrowing the wide range of equipment and procedures employed by different groups, but the absence of "the standard procedure" should not delay gathering data with the techniques currently available. The progress being made by committee D-22 of the American Society for Testing Materials on this phase of air pollution control was reviewed by the speaker.

The final speaker, Mr. Norling, discussed some of the problems attending the elimination of fly ash. Economics plays a very influential role because it frequently is much less costly to clean stack effluent to an acceptable level than to the lowest practicable level.

"New Life" in Air Pollution Work

The ASME — which years ago became interested in this field, as evidenced by its model ordinance and its recommended procedure for stack sampling — has "taken on new life" in this work. The addition of Mr. Mallette to the air pollution controls committee as executive secretary in August of this year will have far-reaching effect. It is safe to predict that the ASME will be in the forefront in much of the future activity in air pollution and its control.—ALLEN D. BRANDT.

Heating Glass-Walled Building

. . . . . for the University of Cincinnati's College of Applied Arts. Three systems comprise the installation

By Frank L. Bonem

THE HEATING AND ventilating installation serving the University of Cincinnati's new Alms building for its College of Applied Arts comprises a hot water heating system to compensate for the heat loss through the large glass areas in the various rooms; a main system which — using tempered air — heats and ventilates the main spaces in the building; and a secondary system which provides heat to the instructors' rooms and for heating and ventilating the stairways.

The building was designed to provide a large lecture hall, an exhibition hall and a library. Each of these is on one of the three floors of the building. Rest rooms, together with the fan room and a small lecture room, are in the basement.

The first floor is divided into two areas by a separation wall — the main lecture hall, which has a capacity for 250 students and is 70 ft x 38 ft, and the lobby and main or No. 1 stairway. The lobby — designed to permit access to the future wings — has five doors. Two make up the main front entrance, one provides an exit to the rear, and two are for entrance and exit to the lecture hall. It is separated from the main stairway by a double wall whose length is about half the width of the building. This hollow wall extends from the basement to the third floor, and has a large air space which is utilized to carry return air and which provides space for vertical piping.

The second floor — designated the exhibition hall — is one large room 97 ft x 42 ft. It has four doors — two leading to the balcony along the north wall, one leading to the No. 1 stairway, and one leading to the No. 2 stairway. The third floor — the library — is almost exactly like the second floor, the main difference being that there are only two doors which lead to the two stairways.

All floor loads are carried by slim columns which run the length of the rooms a few feet from the north and south walls. The second and third floors have small instructors' offices in the southeast corner. All three floors have a small storage room in the southwest corner through which the risers for ventilation ascend.

Baseboard Radiation Under Windows

Under each of the north window areas is baseboard radiation with finned heating elements. Capacities of the various elements and their length are as follows:

1st floor lobby: 16,500 Btu, 30 ft.
1st floor auditorium: 17,600 Btu, 32 ft.
2nd floor exhibition: 39,000 Btu, two sections, 31 ft and 17 ft.
3rd floor library: 51,700 Btu, two sections, 47 ft each.

All these elements are supplied through $1\frac{1}{2}$ in piping; the returns are $\frac{3}{4}$ in.

Design of the main system called for recirculating air with 25 percent make-up under extreme weather conditions up to the required six air changes per hour at 70 F outside temperature. To meet changing outside conditions, the circulating air temperature is regulated by means of an inside-outside thermostat. Thermostats behind each return air grille compensate for changing internal conditions. Bypass or proportioning dampers in the tempering unit direct air over heating coils as necessary and the mixing of outdoor air is controlled by dampers in the outside-air inlet passage.

Provisions for Future Cooling

The heart of this main system is a multi-zone unit, rated at 13,000 cfm, with coils to heat this volume of air from 50 F to 130 F. While provisions were made for cooling coils and bypass, they are planned for future installation. Complete air conditioning can easily be achieved with the addition of these cooling coils and a compressor.

Outdoor air is drawn through a louver and screen in the south wall at the basement level immediately in front of the air mixing plenum and air filter, the latter being directly in front of the unit. The return air duct runs from the hollow double wall in the eastern part of the building along the south wall (two sides of the duct being formed by the wall and floor) and enters the plenum at right angles.

Four zones are used for the various spaces above the basement level. These zones and the calculated Btu heat loss in each are:

Zone 1: 1st floor lobby Zone 2: 1st floor auditorium	230,000
Zone 3: 2nd floor	177,000
Zone 4: 3rd floor	235,000
Basement	25,000
Total (transmission)	667,000
Ventilation load	240,000
Grand total	907,000

For zone 1, the air outlet grille is located in the separation wall between the lobby and auditorium, 8 ft above the floor near the main entrance. The return air grille is almost opposite it in the hollow wall separating the lobby from the main stairway. Zone 2 is supplied through three grilles, two high in the walls of a small room in the southwest corner, and the third above the baseboard in the separation wall in front of one of the rear doors. The return air grille is near the baseboard, also in the separation wall, between the two connecting doors.

Zones 2 and 3 have the air outlets and return grilles in the same locations. The two outlets are high in two walls of the storage room in the southwest corner of the hall and direct the air flow at right angles to each other into the room. The return grille is near the baseboards in the hollow wall.

In short, separate ducts and risers are used to supply all zones; air return is simplified by making a hollow wall the air return duct for all zones except zone 1. For fire security, all return air grilles are backed by fire dampers; the supply ducts have fire dampers where they branch from the risers. Air capacities for the various grilles are as follows:

Zone	Air supply cfm	Air Return cfm
1	1250	940
2	400	
	1624	
	1224	2440
3	2140	
	2140	3200
4	2130	
	2130	3200

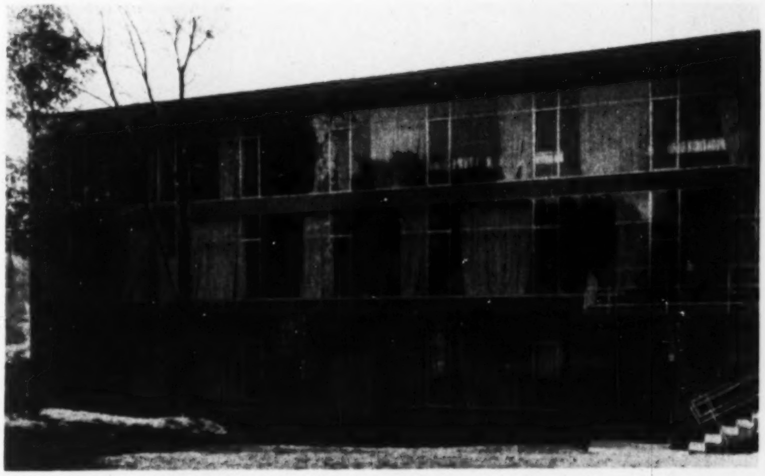
Main constituents of the secondary system are a unit heater in the basement at the foot of stairway No. 2, and a unit heater with a separate blower for stairway No. 1. The latter unit is in a corridor which connects the fan room to the hollow wall and is adjacent to the wall which separates this corridor from the main stairway. It circulates 1750 cfm by means of a supply grille located close to the ground and a return grille just below the basement ceiling.

Steam from Central Boiler Plant

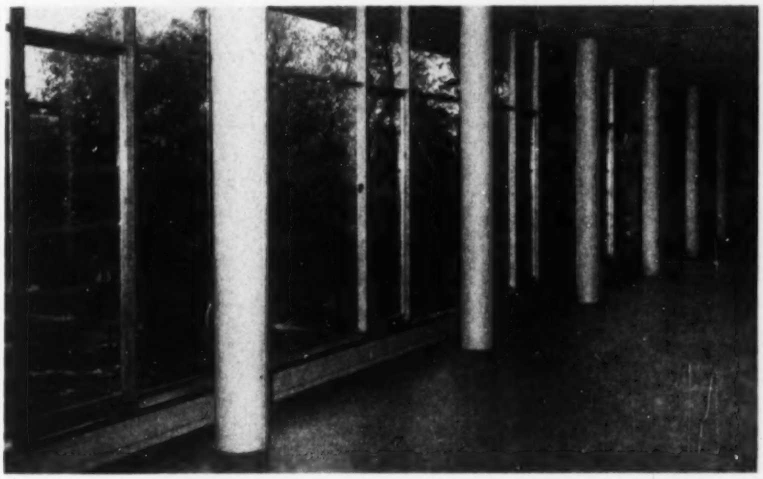
Steam is supplied through a 4 in. high pressure (about 75 psi) line tapped into the main line leading from the campus central power plant. A 2½ in. line carries the condensate return and a ¾ in. line carries returns from a trap in a manhole to the building.

Steam is used to temper air for the ventilating system, a 4 in. line leading to the tempering unit, and to heat water for the hot water heating system, a 2 in. line feeding a convertor. A 1½ in. line feeds the unit heater which supplies the main stairway and a 1¼ in. line feeds the unit heater for the No. 2 stairway. Condensate return from each is in ¾ in. lines. A condensate pump, rated at 10,000 EDR at 40 psi pressure, returns the condensate to the boiler house.

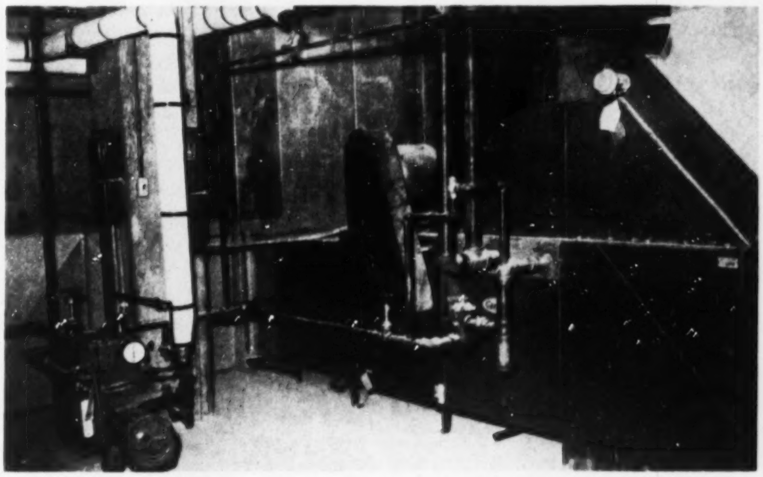
From the convertor, a 2 in. header feeds all branch lines for the closed, forced circulation, hot water heating system. The expansion tank is tied into the header a few inches from its coupling to the convertor and a booster pump is connected into the



NORTH LIGHT for art exhibits, and for painting and drawing classes, is provided by this glass wall. The south wall of the first floor and the north and south walls of the main stairway are also glass



BASEBOARD RADIATION handles the heat loss through the extensive glass areas. This picture was taken in the library before installation of the shelves, furniture and curtains



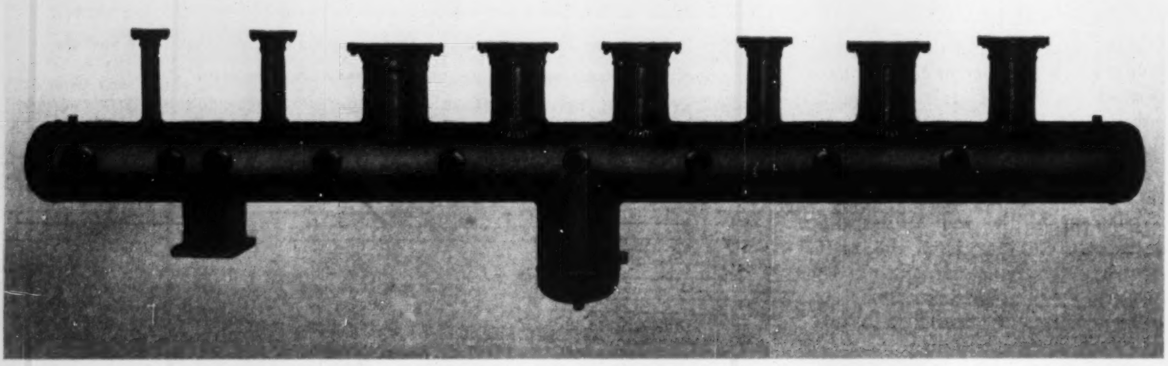
THE 13,000 CFM multi-zone heating and ventilating unit has provisions for adding cooling coils to provide complete air conditioning in the future hot water return line just prior to its return into the convertor.

The piping for the hot water system was planned with the idea of being used but not seen. With the exception of the main pipes and branches for the first floor, which are located below the ceiling of the basement, all piping is in the floors or in air spaces inside the walls. The hollow wall which carries the return air of the ventilating system also carries a 1 in. riser for supply and a ¾ in. riser for return. These lines supply the heating elements along the eastern part of the north walls of the second and third floor and return the water from them. Other supply and return lines for the rest of the heating elements on the second and third floor are located in the dividing wall on the first floor (this supply line feeding only the northwest element on the second floor) and in the east wall of the No. 2 stairway housing. Branch lines from the risers to the elements are, as previously mentioned, built into the floor, thus making the whole system invisible above basement level.

The two convectors in the instructors' offices have separate feed and return lines which are also located in the return air space between the two walls separating the lobby and main stairway.

When entirely completed, the three wings of the building will form a square, the center of which will contain an open air patio to be used for outdoor sketching and lecture classes.

The architect-engineer was James E. Allan, and George Frederic Roth was consultant. The general contractor was Frank Messer and Sons, Inc., with the B. A. Walterman Co. as the contractor for all heating, ventilation, and piping work.



EIGHT FLANGED outlets, 13 screwed outlets, and a drip pocket, yet . . . . . .

Welded Steam Header Is Compact

Welded construction is exceedingly effective for the type of header shown here. The designer has provided multiple branch connections yet has achieved appreciable compactness.

This is a 16 in. main steam header. It is 17 ft, 0 in. long with welding cap end closures. The header contains one 3 in., one 4 in., one 6 in., one 8 in., three 10 in. and one 12 in. welded nozzles; all are fitted with 150 lb forged steel welding neck flanges. The header also is provided with ½, 1, 1¼, 1½, 2 and 3 in. connections — a total of 13 screwed outlets in the form of 3000 lb steel half couplings welded in place. A 16 in. welded drip pocket and a welded anchor base also were included.

After fabrication, the completed header was tested hydrostatically at 300 psi. The total weight is 2000 lb.

Incorporating eight flanged outlets and 13 screwed outlets, plus a drip pocket, in a header 17 ft in over-all length represents the sort of compactness that welded construction permits. This is also a type of piping fabrication which can be produced to advantage in a modern fabricating shop, where specialized skills and facilities for this sort of work are readily available.—G. W. Hauck, Manager, Engineering Sales, Crane Co.

SEEK TO RAISE PIPE FITTER APPRENTICE STANDARDS

A drive for new apprentices and improvement in the quality of apprentice steamfitters and plumbers has been started by the United Association of Journeymen and Apprentices of the Plumbing and Pipe Fitting Industry.

The announcement of the drive followed the statement by the federal government that apprentices in skilled crafts will be exempt from military service.

As part of its campaign to raise the standards of apprentice training, the United Association has announced an annual international apprentice contest open to apprentices in the United States and Canada in their final year of training.

The purpose of the contest is to determine the champion apprentice pipe fitter and the champion apprentice plumber of the year. A prize will be awarded to each.

SHOW Section...

INTERNATIONAL AMPHITHEATRE

Chicago January 26-30

Air Conditioning Exposition—11th International Heating & Ventilating Exposition . . . 59th Annual Meeting of The American Society of Heating and Ventilating Engineers

Quick Picture of the "Big Week"

ASHVE MEETING . . . . .

Technical sessions at 9:30 a.m. Monday, 9:30 a.m. and 1:30 p.m. Tuesday and Wednesday, and 9:30 a.m. Thursday at the Conrad Hilton. See program for full information.

EXPOSITION . . . . .

Opens Monday at 2 p.m. at the International Amphitheatre, and daily Tuesday through Friday at 12 noon. Closing hour is 10 p.m., except on Friday at 6 p.m. See list of exhibitors and diagrams of exhibit layout for full information on "who, what and where."

ON THE LIGHTER SIDE . . . . .

Ladies' luncheon and miniature grand opera at Kungsholm Restaurant, 12 noon to 4 p.m. Monday and Wednesday, with alternate tea and drama program at Conrad Hilton at 2 p.m. each of these days; informal party and get-together, 9 p.m. Monday at Conrad Hilton; ladies' tea and style show 3 p.m. Tuesday, Narcissus Room, Marshall Field & Co.; annual banquet at 7 p.m. Wednesday, Conrad Hilton.

Plan Biggest Meeting and Show

THE TIME OF THE ASHVE Annual Meeting has arrived once again. Within the next few days, engineers, educators, manufacturers, salesmen, contractors and representatives of government will gather in Chicago for the 59th Annual Meeting of The American Society of Heating and Ventilating Engineers. They will be attracted to the nation's second largest city by a common interest in the latest research and development in the fields of heating, ventilating and air conditioning.

The meeting is expected to attract some 3000 heating, ventilating and air conditioning men, their wives and guests from all over the United States and Canada. This will be a far cry from January 1895, when 45 pioneers in the field gathered in New York at the Society's first annual meeting.

Biggest Show Ever To Be Held

The 59th Annual Meeting of the ASHVE will be held in conjunction with the 11th International Heating, Ventilating, and Air Conditioning Exposition. With some 400 exhibitors taking part, this will be the largest show of its kind ever held.

The Exposition will be held at the International Amphitheatre and Chicago Convention Building and will open on Monday afternoon at 2:00 p.m. The show will feature an ASHVE exhibit, *Research At Work*, which will display some of the Society's cooperative and laboratory research projects. This will be in booth 2-325 located in the center of the second floor, and will have a dynamic demonstration of the physiological effects of environment, as well as demonstrations of shading effects on heat transmission through glass, heat radiation from ceiling panels, and the ASHVE low-resistance low-inertia heat flow meter. An information booth with a display of the Society's publications will be maintained on the main floor at booth 905.

Six Busy Technical Sessions

The Program and Papers Committee, under the chairmanship of Prof. E. R. Queer, State College, Pa., has prepared an interesting program of six technical sessions. Among the technical program's highlights (see page 150) are papers on physiological effects of environment, the calculation of friction heads for pipe lines, compression tank selection, odor control, heat from chimneys and fuel consumption analysis. There will be a session devoted to the problems of administering research programs, and an entire session with papers on friction and pressure losses in ducts and fittings and room air distribution. The closing sessions will cover floor panel control systems, heat exchanges in a panel heated room, the shading of sunlit glass, two papers on air velocities in jets, and summer cooling of a residence.

Following the technical papers at the Monday morning session, Dr. Preston Bradley, pastor of the People's Church, Chicago, will speak on the subject, *Today — Tomorrow and You.*

Excellent Program of Special Events

Under the direction of the Committee on Arrangements, headed by W. A. Kuechenberg and G. W. Bornquist, chairman and vice-chairman, respectively, an excellent program of special events has been planned.

On Monday night there will be a Get-Together party at the Conrad Hilton Hotel, featuring dancing and entertainment. The ladies committee has scheduled a round of activities for the fair sex, starting on Monday afternoon with a luncheon and miniature grand opera at the Kungsholm Restaurant. This event will be repeated on Wednesday for those unable to attend on Monday and, as an alternative on either day, a Tea and Drama Program is planned at the hotel. Tuesday afternoon will feature a Style Show and Tea at Marshall Field and Co. In addition, the committee has obtained tickets for several radio shows for the use of members' wives and their guests.

The meeting will be climaxed by the Annual Banquet on Wednesday; it will be highlighted by an address, *This Freedom Of Ours*, by Nathaniel Leverone, Chicago industrialist and civic leader. C. M. Burnam, Jr., of Chicago, will be toastmaster. The F. Paul Anderson Medal will be awarded to E. N. McDonnell, and the Past President's Emblem will be presented to Ernest Szekely.

The Old Timers' Club of the oil burner industry will relax the evening of January 27 at the Furniture Club.

How To Get To Exposition

In addition to using cabs and special busses direct from downtown hotels to the International Amphitheatre, public transportation facilities are also convenient.

By subway —Take southbound subway train on State St., and change at Indiana Ave. for stockyards. Get off at Halsted St. and walk a short block south to the Amphitheatre.

By CTA bus — Take bus marked "Racine and 87th" southbound on State St. direct to the Amphitheatre at Halsted and 43rd St.

By CTA streetcar — Take southbound No. 36 State St. car to 43rd St., transfer to westbound "43rd-Halsted" car to Halsted St., walk short distance south.

By automobile — Go south on Michigan Ave. to 39th St., turn right to go west on 39th to Union Ave., turn left to go south on Union Ave. to Root St., and turn right to go west on Root to the Amphitheatre. . . Another route is to go south on Michigan to 43rd St., and turn right to go west on 43rd to the Amphitheatre, which is on Halsted. . . Another route is to go south on Canal St. to Archer Ave., turn half-right to go southwest on Archer to Union Ave., turn half-left to go south on Union Ave. to Root St., and turn right to go west on Root to Halsted. There is ample parking space back of the Amphitheatre.

Committee on Arrangements for ASHVE Meeting

W. A. Kuechenberg, *General Chairman*
G. W. Bornquist, *Vice Chairman*

Honorary Chairmen
H. M. Hart S. R. Lewis A. C. Willard

Banquet Committee — H. G. Chapin, *Chairman;* C. M. Burnam, Jr., C. A. Imming, P. J. Marschall, R. T. Murphy, E. E. Sundeen, J. F. Tobin.

Entertainment Committee — J. S. Kearney, *Chairman;* W. H. Brackett, G. B. Coffey, A. L. Crump, W. F. Christmann, J. A. Dell, F. E. Moran, H. B. Ross, Henry Seetch, W. A. Stahl, H. G. Swart.

Finance Committee — G. G. Freyder, *Chairman;* H. E. Anderson, H. J. Couch, T. L. Smith.

Ladies Committee — Mrs. G. W. Bornquist, *Chairman;* Mmes. M. J. Bamond, C. M. Barnes, M. W. Bishop, C. M. Burnam, Jr., H. G. Chapin, J. F. Cummiskey, G. G. Freyder, H. G. Gragg, T. V. Johnson, J. S. Kearney, Herbert Kreisman, W. A. Kuechenberg, P. J. Marschall, J. H. Milliken, W. G. Pennington, C. E. Price, G. V. Zintel.

Plant Inspection Committee — C. M. Barnes, *Chairman;* John Gazlay, C. A. Gustafson, F. W. Kramer.

Publicity Committee — T. W. Johnson, *Chairman;* E. G. Avery, M. J. Bamond, S. F. Rost.

Reception Committee — H. G. Gragg, *Chairman;* Herbert Kreisman, *Co-Chairman;* M. J. Bamond, Thomas Cranage, A. L. Crump, L. P. Lang, G. A. Mansinger, R. D. Misch, O. A. Moran, W. G. Pennington, J. J. Philippi, J. C. Scott, L. H. Streb, F. W. Thompson, W. F. Christmann.

Sessions Committee — J. F. Cummiskey, *Chairman;* Norman Bueter, A. M. Bladen, Thomas Cranage, E. H. Gage, N. A. Gregornik, M. F. Koster, Sydney Miner, J. C. Scott, L. H. Streb, E. E. Sundeen, E. R. Teske, R. W. Van Valzah.

Illinois Chapter Officers

President .... M. W. Bishop
Vice President .... H. G. Chapin
Treasurer .... G. G. Freyder
Secretary .... G. V. Zintel

Board of Governors

C. M. Barnes G. W. Bornquist H. G. Gragg
Herbert Krejsman

Advisory Committee for the Exposition

Representation on the advisory committee of the Exposition is shared by the ASHVE — sponsoring society — and a number of engineering societies and trade associations in related fields. Ernest Szekely, president of the ASHVE, is chairman of the group. Other members representing functional and territorial interests of the Society are: Reg. F. Taylor, first vice president, ASHVE; M. K. Fahnestock and John W. James, members of the Council; I. W. Cotton, chairman, Committee on Research; S. R. Lewis and A. C. Willard, past presidents; M. W. Bishop, president, Illinois Chapter; H. R. Limbacher, president, Western Michigan chapter; John A. Lofte, president, Wisconsin Chapter; W. A. Kuechenberg, general chairman, 59th annual meeting. Also, J. M. Frank, B. H. Jennings, F. P. Keeney, Dr. R. W. Keeton, and L. G. Miller.

Representatives of the cooperating groups are the following committeemen: William B. Henderson, executive vice president, Air Conditioning & Refrigerating Machinery Association; William B. Watterson, president, Air Filter Institute; Charles E. Bennett, president, American Gas Association; Carrol A. Farwell, president, American Institute of Consulting Engineers; Edward Simons, president, American Society of Refrigerating Engineers; F. W. Earnest, Jr., president, Anthracite Institute; Andrey A. Potter, president, Bituminous Coal Research, Inc.; William M. Murray, Jr., president, Heating, Piping & Air Conditioning Contractors National Association; R. E. Ferry, general manager, Institute of Boiler and Radiator Manufacturers; Charles M. Gray, manager, Insulation Board Institute; R. A. Wasson, president, National Association of Fan Manufacturers; W. D. Redrup, president, National Warm Air Heating and Air Conditioning Association; T. A. Crawford, president, Oil-Heat Institute of America; R. A. Locke, president, Steel Boiler Institute; L. C. Dubs, president, Stoker Manufacturers Association; Ovid W. Eshbach, president, Western Society of Engineers.

Program

59th Annual Meeting

The American Society of Heating and Ventilating Engineers

The Conrad Hilton Hotel January 26-29, 1953 Chicago, Illinios

(All meetings at the Conrad Hilton unless designated otherwise)

SATURDAY — JANUARY 24

9:30 a.m. TAC ON INSULATION, M. W. Keyes, *Chairman* (*Private Dining Room 19*)

10:00 a.m. FINANCE COMMITTEE, J. W. James, *Chairman* (*Private Dining Room 20*)

10:00 a.m. STANDARDS COMMITTEE, L. N. Hunter, *Chairman*

1:30 p.m. EXECUTIVE COMMITTEE, L. E. Seeley, *Chairman* (*Private Dining Room 20*)

2:00 p.m. ADMISSION AND ADVANCEMENT COMMITTEE, A. W. Edwards, *Chairman* (*Private Dining Room 12*)

3:00 p.m. TAC ON AIR CLEANING, A. B. Algren, *Chairman* (*Private Dining Room 3*)

SUNDAY — JANUARY 25

10:00 a.m. REGISTRATION

10:00 a.m. COUNCIL MEETING (*Private Dining Room 1*)

10:00 a.m. 1952-53 COMMITTEE ON RESEARCH (*Private Dining Room 4*)

3:00 p.m. TAC ON INSULATION, M. W. Keyes, *Chairman* (*Private Dining Room 12*)

MONDAY — JANUARY 26

9:00 a.m. REGISTRATION

9:30 a.m. FIRST TECHNICAL SESSION (*Grand Ballroom*) Pres. Ernest Szekely presiding

Call to Order

Reports of Officers and Council

A Comparison of Physiological Adjustments of Clothed Women and Men to Sudden Changes in Environment, by Tohru Inouye, F. K. Hick, M. D., R. W. Keeton, M.D., J. Losch, Nathaniel Glickman

Two Methods of Calculating Friction Heads for Pipe Lines, by F. E. Giesecke

11:00 a.m. Greetings by M. W. Bishop, President, Illinois Chapter

Response by Pres. Ernest Szekely

Address by Dr. Preston Bradley, Chicago. *Subject:* "Today — Tomorrow and You"

11:30 a.m. LADIES LUNCHEON AND MINIATURE GRAND OPERA (12 noon to 4:00 p.m.) (*Kungsholm Restaurant*) Bus leaves Michigan Ave. & 8th St.

12:30 p.m. COUNCIL LUNCHEON (*Saddle and Sirloin Club*)

1:30 p.m. CHAPTERS' CONFERENCE (*Private Dining Room 1*)

2:00 p.m. EXPOSITION — Opening of 11th International Heating, Ventilating and Air Conditioning Exposition

2:00 p.m. LADIES TEA AND DRAMA PROGRAM (*North Ballroom*)

2:00 p.m. TAC ON THE HEAT PUMP, E. P. Palmatier, *Chairman* (*Private Dining Room 9*)

2:00 p.m. TAC ON INDUSTRIAL ENVIRONMENT, W. N. Witheridge, *Chairman* (*Private Dining Room 4*)

2:00 p.m. TAC ON PANEL HEATING AND COOLING, P. B. Gordon, *Chairman; Groups A, B and D* (*Private Dining Room 2*)

3:00 p.m. GUIDE COMMITTEE, B. H. Jennings, *Chairman* (*Private Dining Room 3*)

9:00 p.m. INFORMAL PARTY AND GET-TOGETHER (*Grand Ballroom*)

TUESDAY — JANUARY 27

9:00 a.m. REGISTRATION

9:30 a.m. SECOND TECHNICAL SESSION (*Grand Ballroom*) First Vice Pres. Reg F. Taylor presiding

Report of Tellers of Elections

Compression Tank Selection for Hot Water Heating Systems, by H. A. Lockhart and G. F. Carlson

The Bacteria and Odor Control Problem in Occupied Spaces, by R. L. Kuehner

Heat Transmitted to the I-B-R Research Home from the Inside Chimney, by W. S. Harris and R. J. Martin.

Fuel Consumption Analysis for Multi-Family Housing Projects, by Rutcher Skagerberg and J. E. Phifer

10:00 a.m. TAC ON AIR DISTRIBUTION, G. B. Priester, *Chairman (Private Dining Room* 10)

10:00 a.m. TAC ON HEAT FLOW THROUGH GLASS, R. A. Miller, *Chairman (Private Dining Room* 9)

12:00 noon TAC ON HOT WATER AND STEAM HEATING, J. W. James, *Chairman (Private Dining Room* 5)

1:30 p.m. THIRD TECHNICAL SESSION (*Grand Ballroom*) Second Vice Pres. L. N. Hunter presiding

Research Administration Symposium
- Participation by Colleges in Research, by E. A. Walker
- Government Sponsored Research — A Canadian View, by R. F. Legget
- Industrial Research in the Control of Environment, by W. H. Kliever

2:00 p.m. TAC ON COMBUSTION, T. H. Smoot, *Chairman (Private Dining Room* 3)

2:00 p.m. TAC ON COOLING LOAD, W. E. Zieber, *Chairman (Private Dining Room* 4)

2:30 p.m. TAC ON SOUND AND VIBRATION CONTROL, by H. A. Lockhart, *Chairman (Private Dining Room* 6)

3:00 p.m. LADIES TEA AND STYLE SHOW (Marshall Field & Co.—*Narcissus Room*, 7th Floor)

7:00 p.m. PAST PRESIDENTS' DINNER

7:00 p.m. TAC ON HEATING LOAD, W. S. Harris, *Chairman (Private Dining Room* 3)

7:30 p.m. COMMITTEE ON CODE FOR TESTING AND RATING HEAVY DUTY FURNACES, E. K. Campbell, *Chairman (Private Dining Room* 12)

WEDNESDAY — JANUARY 28

9:00 a.m. REGISTRATION

9:30 a.m. FOURTH TECHNICAL SESSION (*Grand Ballroom*) Pres. Ernest Szekely presiding

Friction Losses in Round Aluminum Ducts, by F. W. Hutchinson

Pressure Losses in 4-Inch Diameter Galvanized Metal Duct and Fittings, by H. G. Conn, W. G. Colborne, and W. G. Brown

Pressure Loss Characteristics of Small Diameter Round Duct Systems, by G. R. Whitnah and J. V. Borry

Room Air Distribution Research for Year 'Round Air Conditioning—Part I, Supply Outlet at One High Side Wall Location, by S. F. Gilman, H. E. Straub, A. E. Hershey, and R. B. Engdahl

10:00 a.m. TAC ON SORPTION, G. L. Simpson, *Chairman (Private Dining Room* 6)

11:30 a.m. LADIES LUNCHEON AND MINIATURE GRAND OPERA (12 noon to 4:00 p.m.) (*Kungsholm Restaurant*) Bus leaves Michigan Ave. & 8th St.

1:30 p.m. FIFTH TECHNICAL SESSION (*Grand Ballroom*) First Vice Pres. Reg F. Taylor presiding

Report of Committee on Research, by I. W. Cotton, Chairman

Field Studies of Floor Panel Control Systems, by A. B. Algren, E. F. Snyder, Jr., and J. S. Locke

Heat Exchanges in a Ceiling Panel Heated Room, by L. F. Schutrum, G. V. Parmelee and C. M. Humphreys

The Shading of Sunlit Glass—An Experimental Study of Slat-Type Sun Shades, by G. V. Parmelee, W. W. Aubele, and D. J. Vild

2:00 p.m. LADIES TEA AND DRAMA PROGRAM (*North Ballroom*)

3:00 p.m. NOMINATING COMMITTEE, M. W. Bishop, *Chairman*

7:00 p.m. ANNUAL BANQUET (*Grand Ballroom*)

Toastmaster—C. M. Burnam, Jr., Chicago

Speaker—Nathaniel Leverone, Chicago. *Subject*—"This Freedom of Ours"

Presentation of Past President's Emblem to Ernest Szekely, Milwaukee

Presentation of F. Paul Anderson Medal to E. N. McDonnell, Chicago

THURSDAY — JANUARY 29

9:00 a.m. REGISTRATION

9:30 a.m. SIXTH TECHNICAL SESSION (*Grand Ballroom*) Second Vice Pres. L. N. Hunter presiding

Maximum Downward Travel of Heated Jets from Standard Long Radius ASME Nozzles, by Linn Helander, Shee-Mang-Yen, and R. E. Crank

Air Velocities in Ventilating Jets, by G. L. Tuve

Cooling a Small Residence with a Two Horsepower Mechanical Condensing Unit, by H. T. Gilkey, D. R. Bahnfleth, and R. W. Roose

Installation of Officers

Resolutions

Adjournment

12:00 noon 1953-54 COMMITTEE ON RESEARCH (organization meeting) (*Private Dining Room* 9)

1:30 p.m. COUNCIL MEETING (*Private Dining Room 10*)

FRIDAY — JANUARY 30

12:00 noon EXPOSITION—11th International Heating, Ventilating and Air Conditioning Exposition (International Amphitheatre). Closes at 6 p.m. ASHVE Booths Nos. 905 and 2-325

Ernest Szekely
President

Reg F. Taylor
First Vice President

Louis N. Hunter
Second Vice President

J. Donald Kroeker
Treasurer

W. A. Kuechenberg
General Chairman

G. W. Bornquist
Vice Chairman

Dr. Preston Bradley
Speaker, First Session

ASHVE

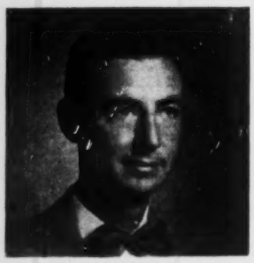
59TH ANNUAL MEETING

Nathaniel Leverone
Banquet Speaker

January 26-29, 1953

C. M. Burnam, Jr.
Toastmaster, Banquet

Conrad Hilton Hotel



M. W. Bishop
President
Illinois Chapter

H. G. Chapin
Chairman
Banquet

G. G. Freyder
Chairman
Finance

G. V. Zintel
Secretary
Illinois Chapter

EXPOSITION EXHIBITORS AND THEIR EXHIBITS

HERE ARE THE names of the exhibitors who are scheduled for the 11th Air Conditioning Exposition — the International Heating & Ventilating Exposition, per latest advice at press time from the exposition management. Those listed with information on the products they will exhibit and the names of representatives who will be in attendance furnished these details direct to the publisher. With the booth numbers and the accompanying diagrams of the exhibit hall, each exhibitor is easily located.

The exposition is under the management of the International Exposition Co., Charles F. Roth, manager, E. K. Stevens, associate manager.

(See layout of exhibit hall on pages 156 and 157)

A-J MFG. CO., 2119 Washington St., Kansas City 8, Mo.—Booth 906

In attendance: Arthur S. Hurt, Jr., Ernest S. Preuitt, M. E. Hurt.

Exhibiting: Complete line of no-vision door and partition grilles; heating and air conditioning diffusers; registers and grilles. Thin core no-vision grille for ¼ in. to ¾ in. partition, and perimeter diffusing floor register, will be featured.

A-P CONTROLS CORP., 2450 N. 32nd St., Milwaukee 45, Wis.—Booths 1107, 1109.

In attendance: R. W. Johnson, D. Moerick, T. J. Melville, R. W. Sloane, R. A. Simpson, A. A. Schubert, H. J. Welch, B. T. Carroll, J. F. Cowan, J. W. Hall, F. J. Marshall, R. E. Morton, A. L. Neva, R. E. Petersen, N. C. Port, L. C. Thompson, H. D. Youmans, D. G. Tmey, A. L. Topp, F. O. Kovich, S. A. Johnson.

Exhibiting: Oil and gas controls; refrigeration controls; model 240 MT-YS comfort control; Model 50 water heater "Gasapack"; and model 54 comfort snap control will be featured.

ACE ENGINEERING CO., 1435 W. 15th St., Chicago 8, Ill.—Booth 427

In attendance: I. L. Schurman, J. W. Cowan, R. W. Linden, R. W. Bardach, Jr., A. F. Jelenc, A. Eckstein, S. Padove, H. G. Fovell.

Exhibiting: "Uniflow" horizontal rotary oil burners and combination oil-gas burners. "Unipak" combination oil-gas burner with factory built and tested panel board, will be featured.

ACME INDUSTRIES, INC., 600 N. Mechanic, Jackson, Mich.—Booths 1134, 1136, 1138

In attendance: K. A. Weatherwax, G. L. Baldwin, P. A. Weatherwax, E. B. Dunphy, A. B. Newton, C. W. Millsom, D. G. Merrill, H. W. Smith, J. T. Maloney, R. C. Deeg, R. L. Fisher, K. D. Cunningham, R. T. Hansen, W. H. Armstrong, G. V. Mercer, E. A. Morrison, W. E. Lloyd.

Exhibiting: "Flow-Temp" heat pump; "Flow-Temp" remote room conditioner; "Dry-Ex" water chiller; package water chiller; cooling towers; heat exchangers; oil separators; shell and tube and shell and coil condensers. Operating heat pump system will be featured.

ACRO MFG. CO.—see CRISE CONTROLS DIV.

AIR CONTROL PRODUCTS, INC., Coopersville, Mich.—Booth 2-124

In attendance: Robert L. Leigh, Kenneth L. Babcock, Winston A. Clark, R. C. Hackenbruch, Claude E. Denton, Donald E. Stoll, Elmer G. Biele, Paul K. Schneider.

Exhibiting: Registers, grilles, diffusers, perimeter registers, ventilators. New line of perimeter diffusers will be featured.

AIR CONTROLS, INC., DIV. OF CLEVELAND HEATER CO., 2310 Superior Ave., Cleveland 14, Ohio—Booth 442

In attendance: B. G. Krause, N. Busch, O. A. Harris, J. F. Brainard, Paul R. Jett, Arthur E. Friedman.

Exhibiting: Air conditioning blowers; furnace blowers; blower filter units; propeller fans; attic fans; window fans. 20 in. belt driven window fan will be featured.

AIR DEVICES INC., 17 E. 42nd St., New York, N. Y.—Booths 1310, 1312, 1314

In attendance: C. N. O'Day, G. J. Sweeney, T. A. Hughes, P. G. Daves, I. M. Day, Jr., C. A. Eades.

Exhibiting: "Agitair" air diffusers, air filters, grease filters, exhausters, dampers, "Flexitrols". Type RC air diffusers with removable core, "Stripline" diffusers, and new instruments for measuring air velocities used in balancing air conditioning systems will be featured.

AIR-MAZE CORP., 5200 Harvard Ave., Cleveland 5, Ohio—Booths 1211, 1213

In attendance: W. B. Watterson, N. L. Lamprecht, J. D. Thomas, E. M. Paullin, J. M. Clem.

Exhibiting: Viscous impingement panel type air filters and electric air filters.

AIRTEMP DIV., CHRYSLER CORP., 1600 Webster St., Dayton 1, Ohio—Booth 734

AIRTHERM MFG. CO., 700 S. Spring Ave., St. Louis 10, Mo.—Booth 1220

In attendance: N. B. Barsha, W. C. Brandau, F. P. Kohlbry, Ray O. Reeves.

Exhibiting: Convector radiators, gas fired unit heaters, propeller fan type steam unit heaters, blower fan type steam unit heaters, oil or gas direct fired space heaters, 650,000 to 2,000,000 Btu per hr output capacity. Gas fired unit heaters, redesigned convector radiators, and redesigned propeller fan steam unit heaters will be featured.

ALDRICH CO., 105 Williams St., Wyoming, Ill.—Booths 424, 426

In attendance: P. M. Stephenson, E. L. Fox, B. Mulder.

Exhibiting: "Heat-Pak" "B" series and Gulf Stream "C" series boiler-burner units (oil and gas fired), high pressure conversion oil burners. New competitively priced package boiler-burner units that are pre-wired, accessory equipped, ready to set in place and connect will be featured. There are five sizes, 440 to 1120 sq ft net water radiation, to cover the heating and domestic hot water needs of small and medium sized homes.

ELEVENTH
Air Conditioning
Exposition
INTERNATIONAL HEATING & VENTILATING EXPOSITION
INTERNATIONAL AMPHITHEATRE, CHICAGO
JANUARY 26-30, 1953

ALLEN-BRADLEY CO., 136 W. Greenfield Ave., Milwaukee 4, Wis.—Booths 2-108, 2-112

In attendance: H. Rosenkranz, L. M. Perkins J. McC. Price, D. L. Anderson, K. E. Gorder, C. T. Roy, H. Julien, J. J. Mellon, Jr., J. Clagett.

Exhibiting: Line of industrial motor control, including motor starters and accessories, many types of pressure and temperature controls.

ALLIS-CHALMERS MFG. CO., 1126 S. 70th St., Milwaukee 1, Wis.—Booths 516, 518

In attendance: Robert N. Brown, Walter Meyer, M. L. Murdock, O. V. Talley, J. C. Collier.

Exhibiting: Small motors; controls, "Texrope" drives, small pumps.

AMERICAN AIR FILTER CO. INC., 215 Central Ave., Louisville 8, Ky.—Booths 735, 737

In attendance: John Hellstrom, Harry Noles, James May, Irving Clark, Robert Walker, John Willis, Charles Wright, Arthur Miller.

Exhibiting: Electronic precipitators ("Electromatic", "Electro-Cell"); electronic air filters ("Electro-PL"), air filters ("Multi-Duty," "PL-24;" "American HV," "American MW," "Deep Bed," "Amer-glas"). New model of self-cleaning "Electro-Cell" will be exhibited for the first time, and an animated display explaining efficiency ratings by different methods for various classes of filters will be featured.

AMERICAN AIR FILTER CO. INC.—also see HERMAN NELSON PRODUCTS

AMERICAN ARTISAN, 6 N. Michigan Ave., Chicago 2, Ill.—Booth 425

In attendance: Frank P. Keeney, Charles E. Price, Wallace J. Osborn, Robert A. Jack, George C. Cutler, James D. Thomas, C. M. Burnam, Jr., Clyde M. Barnes, Robert J. Osborn, Frank S. Easter, James E. Sacra, David V. Mahan.

Exhibiting: American Artisan, technical books, market data.

AMERICAN BLOWER CORP., 8111 Tireman, Detroit 32, Mich.—Booth 714

Exhibiting: Propeller fan; kitchen fans; steam and hot water unit heater; gas fired unit heater; heavy duty steam coil; air conditioning unit; utility blower. Power roof ventilator will be featured.

AMERICAN COILS CO., 360 Thomas St., Newark 5, N. J.—Booths 2-209, 2-213, 2-215

AMERICAN DISTRICT STEAM CO., INC., Bryant St., North Tonawanda, N. Y.—Booth 2-236

In attendance: John L. McGara, Arthur H. Sy, James G. Kintner, Joseph J. Maurin, Thomas C. McCarthy, Alan C. Spitzer, William H. Worth.

Exhibiting: Expansion joints, both packless and slip type; heat exchangers; steam traps; strainers; separators; gas pressure regulators, rotary condensate meter; "Corruflex" packless expansion joint, and a wide variety of packless expansion joints developed within the last year — and which require no maintenance (swing joint, universal joint, balanced joint, gimbal joint) — will be featured. An operating hinge-joint installation will also be a feature of the "Adsco" display.

AMERICAN FURNACE CO., 1300 Hampton Ave., St. Louis 10, Mo.—Booth 2-204

In attendance: Charles H. Franke, Russell Archibald, Howard Carlson, Robert Meigs.

Exhibiting: Warm air heating and summer air conditioning equipment.

AMERICAN GILSONITE CO., 1145 E. Jersey St., Elizabeth, N. J.—Booth 2-530

In attendance: John F. Williams, A. P. Dowler, E. F. Goodner.

Exhibiting: "Gilsulate", a new method of insulating and corrosion protection for underground steam pipe lines.

AMERICAN HYDROVAC DIV. OF PITZ FOUNDRY, INC., 290 Scholes St., Brooklyn 6, N. Y.—Booths 2-418, 2-420

In attendance: A. C. Hauser, Robert M. Pitz, Robert G. Pitz, J. Pedersen, J. B. Whittaker.

Exhibiting: Vacuum pumps; "Spacemiser" and other condensate pumps; boiler feed unit with cast iron tank. "Hydrovac" exhauster. Boiler feed unit with cast iron receiver, awarded first prize for design by Gray Iron Founders' Society, will be featured.

AMERICAN IRON AND STEEL INSTITUTE —see COMMITTEE ON STEEL PIPE RESEARCH

AMERICAN MACHINE & METALS, INC.— see DeBOTHEZAT FANS DIV.

AMERICAN RADIATOR & STANDARD SANITARY CORP., P. O. Box 1226, Pittsburgh 30, Pa.—Booths 708, 714, 715, 815

Exhibiting: "Mohawk" winter air conditioner, "Mayfair" summer air conditioner; "Magnefilter" air cleaner; "Seneca" winter air conditioner; "Winterway" winter air conditioner; "Winterglo" winter air conditioner; "Navaho" floor furnace; "Pawnee" winter air conditioner; "Wyandotte" winter air conditioner; "Empire" boiler; "Arcoliner" wet base boiler; "Sanflame" gas conversion burner; "Arcoflame" oil conversion burner; "Budget" water heater; "Heatrim" panels; "Radiantrim" panels; "Sunra" radiator; new multifin convector; "Remotaire" room conditioner.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, Headquarters, 62 Worth St., New York 13, N. Y.—Booth 905. Research Laboratory, 7218 Euclid Ave., Cleveland 3, Ohio.—Booth 2-325

In attendance: Representatives from ASHVE Research Laboratory, and a physiologist and a technician from the University of Illinois.

Exhibiting: A dynamic demonstration of the physiological reactions of clothed humans to sudden changes in environment; ASHVE low-inertia, low-resistance heat flow meter; effect of shading on heat transmission through glass, heating by means of radiant panels. Exhibit will demonstrate the so-called "shock effect" studies. Two air conditioned booths will be used. The condition in one booth will be that of a comfort air conditioned space, and that in the other one will simulate a hot-humid street on a summer day. A human subject in typical summer attire will spend a certain amount of time in each condition, and then pass from one to another as people do during the summer months. Suitable instrumentation will show on charts the changes in skin temperatures at various points on the body as the person passes from one environment to the other. Medical doctors and physiologists will explain the changes and their significance.

AMERICAN SOLVENT RECOVERY CORP. — see PUR AIR DIV.

ANCHOR DIV., STRATTON & TERSTEGGE CO. INC., 300 Culbertson St., New Albany, Ind.—Booths 2-715, 2-717

In attendance: J. L. Meagher, E. J. Fackler, Ed Clifford, J. W. Oeffinger, Bob Adams.

Exhibiting: Stokers; oil burners; gas conversion burners; furnaces; boilers; furnace pipe.

ANDERSON CO., V. D., 1935 W. 96th St., Cleveland 2, Ohio.—Booths 917, 919

In attendance: Wm. J. Gleason, Jr., Bruce R. Wright, Michael J. Toth, R. J. Grill, W. P. Nevins.

Exhibiting: Steam traps; strainers; air release valves; purifiers. Working model of a new purifier will be featured.

ANEMOSTAT CORP. OF AMERICA, 10 E. 39th St., New York 16, N. Y.—Booth 614

In attendance: C. M. Wilson, R. F. Hayes, F. Honerkamp, A. J. Devitt, W. F. Peters, U. F. Sela.

Exhibiting: Air diffusers; high velocity units; "Anemotherm" air meters.

ANTHRACITE INSTITUTE, 101 Park Ave., New York 17, N. Y.—Booths 1309, 1311, 1313, 1315, 1317, 1321

In attendance: Gordon M. Campbell.

Exhibiting: Anthracite stokers, stoker boiler and furnace units; "Anthratubes" for residential use and commercial crossfeed anthracite stokers and an "Anthra-Hearth" fireplace grate.

APRIL SHOWERS CO., INC.—see AQUA-SOLAR ENGINEERING

AQUA-SOLAR ENGINEERING AND APRIL SHOWERS CO., INC., 2620 S. 9th Ave., Maywood, Ill.—Booth 2-314

In attendance: Daniel Wright, William Syverson, D. L. Knoll, Albert Haron, Leonard H. Holder.

Exhibiting: Automatic roof cooling systems and spray heads; Automatic controls; "Muellermist" underground lawn sprinkling systems; residence air cleaned heads humidity auxiliary control will be featured.

ARMSTRONG FURNACE CO., 851 W. 3rd Ave., Columbus 8, Ohio—Booths 1301, 1302

In attendance: D. H. Kinnan, L. G. Hickok, W. J. Olsen, H. C. Gallcher, Charles Brooks, P. Y. Matthews, T. M. Gallagher, Robert Tolliver, Ross Huntington, Carl Bryson, H. G. Hays, J. R. Swinehart, F. R. Vaughn, George Zimbelman.

Exhibiting: Warm air heating and winter air conditioning equipment for gas and oil firing, central cooling equipment; oil and gas burners. Counterflow and horizontal gas and oil furnaces for perimeter heating and small pipe systems, and cooling equipment in 2, 3 and 6 ton packages, featuring hermetically sealed compressor units, will be shown.

ARMSTRONG MACHINE WORKS, Maple St., Three Rivers, Mich.—Booth 2-425

In attendance: A. E. Armstrong, T. H. Rea, O. E. Ulrich, T. M. Reed, Chas. Daugherty.

Exhibiting: Steam traps; steam humidifiers, forced circulation hot water heating control. Working models of steam traps and humidifiers will be featured.

ATLANTIC PIPEBENDING & FABRICATING CORP., 552 River Rd., Edgewater, N. J.—Booth 929

In attendance: S. H. Nitzberg, J. H. Macaulay, A. Semonchik.

Exhibiting: Pipe bends; "Ray-Flo" valves.

ATLANTIC STEEL BOILER CO., INC., 22nd St. & Washington Ave., Philadelphia 46, Pa. —Booth 2-104

In attendance: John C. Barnes, R. K. Barnes, Joseph A. Greway, Harry H. Hellerman, Philip J. Miller, Paul J. Thompson, E. F. Kuehl, A. A. Redderson.

Exhibiting: Fire tube and water tube boilers.

AUER REGISTER CO., 6600 Clement Ave., Cleveland 5, Ohio—Booth 2-137

In attendance: George R. Metzger, Herbert F. Curtis, Allen H. Bechtel, F. Joseph Butler.

Exhibiting: Complete line of registers and grilles for the heating, ventilating and air conditioning industry.

AU-TEMP-CO CORP., 520 Broadway, New York 12, N. Y.—Booth 908

In attendance: Albert Fowler, Edward J. Zeitlin, Lee Leighton.

Exhibiting: Electronic indoor-outdoor heating control; motorized valves. New oil immersed valve control motor will be featured.

AUTO-FLO CORP., 13526 Fenkell, Detroit 27, Mich.—Booth 2-341

In attendance: M. Perlman, D. Sutherland, V. Vogel, J. Perlman, W. Gift, H. Burke, J. Miner.

Exhibiting: Automatic humidifiers.

AUTOMATIC DEVICES CO., INC., 714 Hillgrove Ave., Western Springs, Ill.—Booth 534

In attendance: H. T. Kucera, O. W. Dobson, F. L. Thuemling, E. Barta.

Exhibiting: "Weather-Man" control of building heating from outdoors; "Weather-Flo", indoor-outdoor control of building heating; "Weather-Chron," a weather actuated day-night time switch; "Model A Weather-Flo," an indoor-outdoor control with balancing room temperature effect. New regulator which modulates for variations of indoor temperatures due to solar heat, cooking, fireplace heat or excessive body heat input will be featured. It is adjustable on the job to existing conditions.

AUTOMATIC FIRING CORP., 4417 Oleatha Ave., St. Louis 16, Mo.—Booths 308, 310, 312, 314

In attendance: James J. Lee, F. J. Hollerbach, W. M. Gonzenbach, E. A. Kuhn, J. Van Dillen.

Exhibiting: "Gas-A-Fire" gas conversion burners and forced warm furnaces; "Oil-A-Fire" oil conversion burners and forced warm furnaces; "Dual-A-Fire" dual fuel (gas and oil) conversion burners and forced warm air furnaces; "Cool-A-Matic" room air conditioners, and packaged air conditioners; "Frigd-A-Fire" combination heating and cooling units. 1953 models of room coolers, and combination heating and cooling unit with air cooled condenser, eliminating use of water entirely, will be featured.

AUTOMATIC HUMIDIFIER CO., 19th & Main St., Cedar Falls, Ia.—Booth 2-115

In attendance: J. W. Galloway, L. W. Reining, W. E. Simpson, H. H. Galloway.

Exhibiting: "Thermo-Drip" and "Vaporite" humidifiers No. 555 and No. 577 humidifier package unit and No. CF-500 humidifier assembly for counterflow furnaces will be featured.

AVCO MFG. CORP.—see CROSLEY DIV.

AXEMAN-ANDERSON CO., 233 West St., Williamsport 3, Pa.—Booths 1309 to 1321

In attendance: Gordon M. Campbell.

Exhibiting: "Anthratube".

BACHARACH INDUSTRIAL INSTRUMENT CO., 7301 Penn Ave., Pittsburgh 8, Pa.—Booth 1346

In attendance: Members of sales and engineering service departments.

Exhibiting: Testing instruments for heating and air conditioning, including "Fyrite" combustion testing kits, vaporizing burner adjusting kit, and instruments for balancing heating systems. Included in the latter group are "Tempscribe" temperature and operation recorders, "Florite" direct reading velocity meter, and a sling psychrometer. Combustion testing kits and special purpose instruments for gas burner adjustments will be featured.

BAHNSON CO., 1001 S. Marshall St., Winston-Salem, N. C.—Booths 522, 524, 526

In attendance: A. H. Bahnson, Jr., H. J. Haslam, R. M. Anderson, H. W. Reid, H. S. Kelley, R. C. Schneider, F. C. Evans, C. R. Long, A. R. Close.

Exhibiting: Complete line of industrial humidification and air conditioning equipment. On display will be unit humidifiers, pneumatic atomizers, humidity controls, and various components for industrial air conditioning systems. On operating display will be a new self-contained industrial humidifying unit developed for automatic control of humidity in all types of commercial and industrial spaces, and which may be used as a complete humidification system, for spot humidification, for boosting existing systems, and for precise humidity control in laboratories and test chambers.

BAKER REFRIGERATION CORP., South Windham, Maine—Booths 2-306, 2-308

In attendance: Mark F. Mooney, W. C. Rehor, J. L. Bodine, C. N. Bellm, O. A. Pfaff, E. H. Burge, A. M. Reilly, Donald Parkhurst.

Exhibiting: 7½ hp store air conditioner; ¾ hp room air conditioner, 25 ton packaged water chiller.

BALDOR ELECTRIC CO., 4353 Duncan Ave., St. Louis 10, Mo.—Booth 2-133

In attendance: David Halliday, Edward Mahle, Paul Travers, Fred Baliman, E. W. Bruce.

Exhibiting: Complete line of totally enclosed "Stream Cooled" motors from 1 to 15 hp inclusive; precision bench grinders. New line of unit heater and air conditioning motors in ratings of 1/20 to ½ hp inclusive will be featured. In reduced frames, it is called the "Baltric" line.

BALTIMORE AIRCOIL CO., INC., 2615-35 Mathews St., Baltimore 18, Md.—Booth 939

In attendance: John Engalitcheff, Jr., Ray R. Forseille, R. W. Pentecost, A. M. Norris, M. K. Kok.

Exhibiting: Scale models of line of evaporative condensers and cooling towers which are factory assembled and require no job erection other than rigging into place and piping and wiring.

BARBER-COLMAN CO., 1300 Rock St., Rockford, Ill.—Booth 508

In attendance: C. J. Braatz, C. P. Yates, E. A. Greenlee, M. J. Bamond, W. G. Young, D. L. Dittloff, J. E. Wright, A. J. Arnold, L. C. Plaehn, H. E. Shugars.

Exhibiting: Automatic control and air distribution products — outdoor reset hot water controls; "Econostat", proportioning controls; electronic humidity controls; industrial combustion equipment; sidewall and ceiling type air distribution equipment. High pressure air distribution equipment and electronic humidity controls will be featured.

BARKOW MFG. CO., INC., AUG. G., 2230 S. 43rd St., Milwaukee 15, Wis.—Booth 2-1012

In attendance: August G. Barkow, C. E. Melcher, Ray McGarry.

Exhibiting: 2 ton residential air conditioning unit; 3 ton commercial air conditioning unit. Self contained, sealed, residential air conditioning unit for use with warm air furnaces will be featured.

BARNES & JONES, INC., 128 Brookside Ave., Boston 30, Mass.—Booth 12[illegible]

In attendance: John B. Hogan, Carl W. Larson, Norman J. Shaw, Eric Lund, Walter E. Barnes.

Exhibiting: Radiator valves; thermostatic traps; float and thermostatic traps; trap replacement units; zone control heating systems.

BELGIAN ELECTRIC SALES CORP., 1 E. 53rd St., New York 22, N.Y.—Booth 2-313

BELL & GOSSETT CO., 8200 N. Austin Ave., Morton Grove, Ill.—Booths 1207, 1209

In attendance: E. J. Gossett, R. F. Moore, C. E. Pullum, R. A. Patterson, W. A. Boone, H. A. Lockhart, W. S. Clough, George Bornquist, Frank C. Hackett, and others.

Exhibiting: "B&G Hydro-Flo" forced hot water heating, industrial and refrigeration products; "B&G" boosters; indirect water heaters; "Flo-Control" valves; "Airtrol" fittings; comfort control valves and relief valves; "B&G" industrial and refrigeration equipment, including centrifugal pumps and heat exchangers. Exhibit will feature applications of forced hot water heating to all types of buildings, including small homes, widely separated garden apartments, and multi-story structure. New products will include small, light, high efficiency boosters, and centrifugal pumps with mechanical seal.

BETT-MARR MFG. CO.—see House & Co., T. S.

BEVERLY SHEAR MFG. CO., 3004 W. 111th St., Chicago 43, Ill.—Booth 2-307

In attendance: Kurt W. Nebel, R. J. Nebel, George K. Nebel, Robert L. Christensen, Stanley J. Kalish, Alice L. Arkell, Frances M. Nebel.

Exhibiting: Throatless shears; slitters; inside slotter; and cable cutter. Rod cutter will be featured.

BINKS MFG. CO., 3114-40 Carroll Ave., Chicago 12, Ill.—Booth 2-125

In attendance: C. R. Kranz, A. G. Stacy, James Doherty, Alfred Jeslee, Ronald Kumataka.

Exhibiting: Cooling towers, industrial spray nozzles, and related heat exchange equipment. Small compact cooling tower for residence air conditioning, complete with blower and pump, for refrigeration capacity of 2 to 3 tons, and other towers from 10 to 100 tons and up, will be featured.

BOILER ENGINEERING & SUPPLY CO., INC., Manavon St., Phoenixville, Pa.—Booth 2-141

In attendance: R. E. Burke, R. E. Emrich, J. Hohenleitner, W. Palm, W. B. Riley.

Exhibiting: "Continental" automatic boiler.

BORG-WARNER CORP.—see NORGE HEAT DIV.

BOSTON MACHINE WORKS CO., 7 Willow St., Lynn, Mass.—Booth 2-140

In attendance: Ralph L. Dennis, I. M. Nelson, Tony Torrisi, H. C. Walters, Lars Schulein, Burt Vickery, Howard Nunnally, Fred Bottiger.

Exhibiting: "Apthorp" nozzle; "Clearview" tank gage; "Ideal" nozzle extractor; "Boston-Standard" draft control, "BosMaco-Apthorp" nozzle kit; "Hang-down" baffle; "Instant-Glo" combustion chambers; "Boston Breeze" burner; and featuring "Boston" head and "Wigwam" flue cap.

BROWN PRODUCTS CO., 97-12 Metropolitan Ave., Forest Hills, N. Y.—Booths 933, 935

In attendance: A. Brown, J. Aronczyk, S. Rosenthal, H. Hansen, J. R. Younger, J. A. Murphy.

Exhibiting: Baseboard radiation, fin tube radiation, convectors and unit heaters. Heating and air conditioning unit will be featured.

BRUNDAGE CO., 512 N. Park St., Kalamazoo 11, Mich.—Booth 2-304

In attendance: H. F. Brundage, F. W. Brundage, J. E. Brundage, W. A. Rockafield, H. A. Austin, Lou Reining, Bruce McLouth, Bert Moncrief, Harold Winningham, Howard Nunnally, Fred Bottiger, Walter Briggs, Joseph Babush, Ed Zieve.

Exhibiting: Direct drive blower; furnace blower assembly; blower exhauster; blower-filter package unit.

BRUNNER MFG. CO., 1821 Broad St., Utica, N. Y.—Booths 2-209, 2-213, 2-215

In attendance: Frank C. Hawk, Pete Hatcher, J. Junkin, J. Reid, J. Lyons, B. Menard, L. B. DeMarsh, B. Haldeman.

Exhibiting: Small refrigeration compressors and condensing units, large refrigeration condensing units, two stage refrigeration condensing units; water chillers; self contained air conditioners (business and residential); "Ice Builders." New "Brunner-Metic" semi-hermetic condensing units, 2 ton residential type air conditioner to install in conjunction with new or present warm air furnaces, "Ice Builder," and water chiller will be featured.

BUFFALO FORGE CO., 490 Broadway, Buffalo, N. Y.—Booths 201, 202

In attendance: C. C. Cheyney, R. T. Thornton, R. P. Warren, S. M. Trumbo, E. P. Heckel, J. W. Kipphut, F. B. Stubinger, J. E. Gill, R. D. Madison, K. R. Berggren, R. Jorgensen, F. J. Debus, W. H. Holt.

Exhibiting: New ventilating fan; industrial exhaust fan, pressure blower, vaneaxial fan; new "Diamond Jubilee Breezo" fan, horizontal type "PC" conditioning cabinet, 4 in. double suction single stage pump; new 16 in. "Breezo" disk fan; new 24 in. "Belt-Air" disk fan. Conditioning cabinet will have transparent top so that parts can be seen.

BUFFALO PUMPS, INC.—see BUFFALO FORGE CO.

BUILDERS-PROVIDENCE, INC., 345 Harris Ave., Providence 1, R. I.—Booth 1344

In attendance: Fred W. Deutsch, Robert M. Gwynne, Winthrop W. Adams, G. E. Riepe.

Exhibiting: "Shuntflo" steam meter; new design model AFQUA "Flo Watch" for liquids, steam, air or gas; Venturi insert nozzles and orifice plates. The new "Flo Watch" is an adaptation of a line of instruments in which economies have been effected by redesigning. It will accurately meter liquids, steam, air or gas when used in conjunction with a venturi insert nozzle, venturi tube or orifice plate. The newly designed "Shuntflo" is a tool for metering steam or air, enables saving operational steam cost, balancing steam systems; controlling departmental heating, measuring steam output in process work, and keeping efficiency records of steam producing units. It will also accurately meter manufactured or natural gas.

BUNDY TUBING CO., 8109 E. Jefferson Ave., Detroit 14, Mich.—Booths 1333, 1335

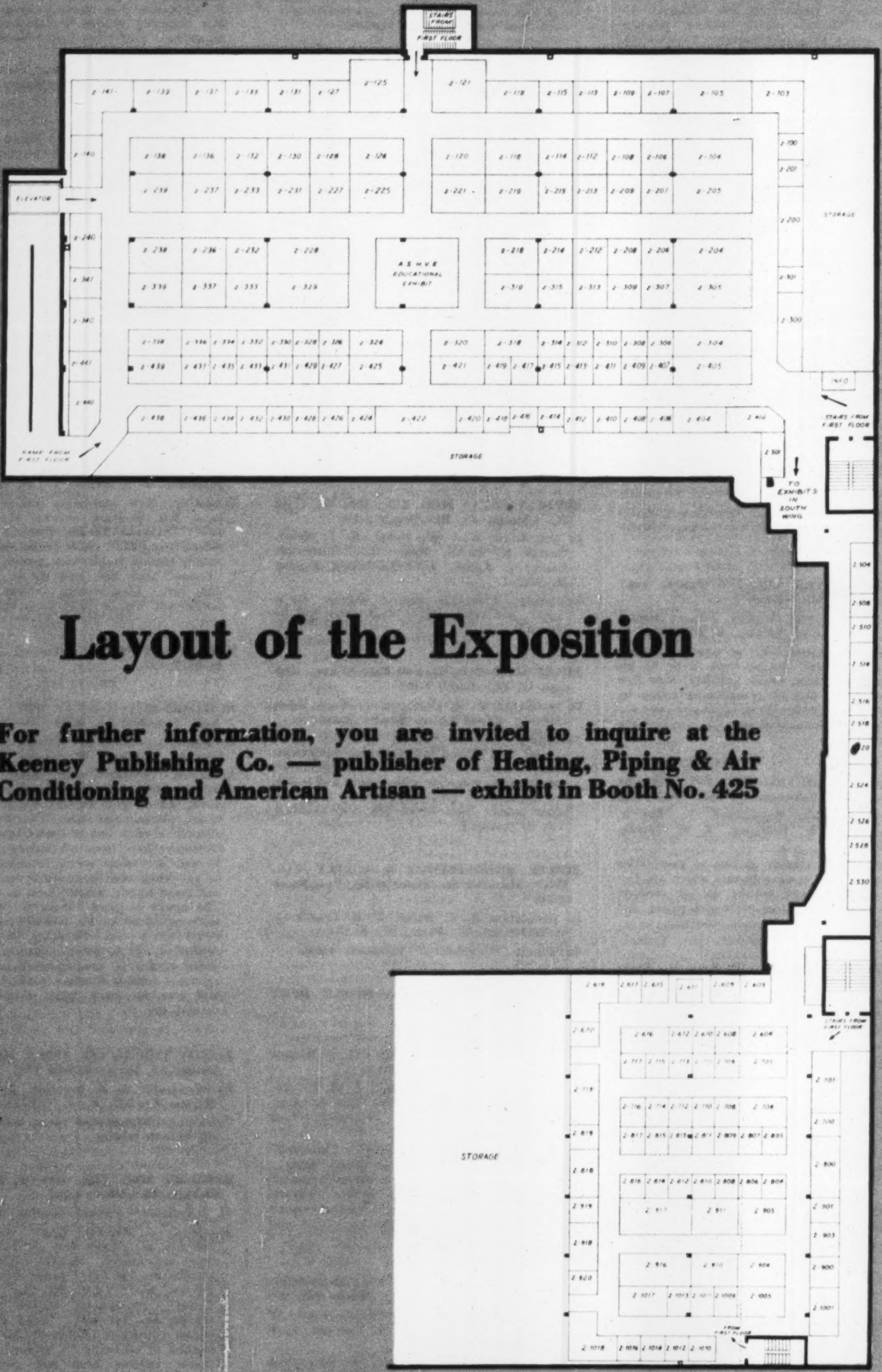
In attendance: A. F. Bernthal, Robert Ireland Warren Kendall, P. A. O'Connell.

Exhibiting: "Bundyweld" steel tubing for ceiling radiant heating.

BURDETT MFG. CO., 3433 W. Madison St., Chicago, Ill.—Booth 2-903

In attendance: Procter Brevard, Robert Cuff.

Exhibiting: "Radiant Heat" power burner (100,000 to 200,000 Btu per hr); "Upshot" type atmospheric burner (80,000 Btu to 180,000 Btu per hr); "Junior Upshot" burner (50,000 to 125,000 Btu per hr); "Heat Tower" atmospheric burner (100,000 to 160,000 Btu per hr); "Junior Heat Tower" burner (50,000 to 125,000 Btu per hr). Unique method of obtaining "a maximum amount of usable radiant heat and convected heat coupled with maximum combustion efficiency" will be featured.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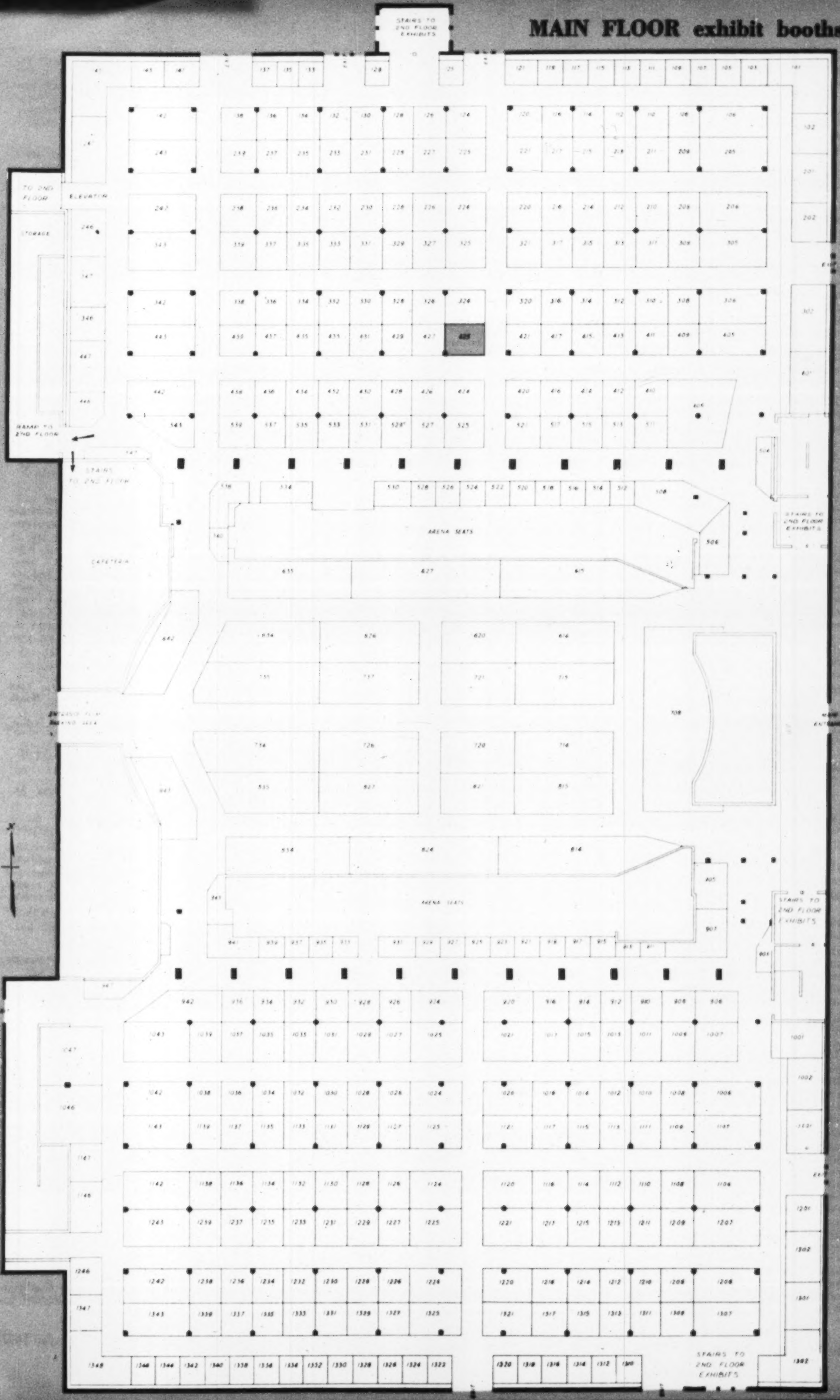
FROM FIRST FLOOR

Layout of the Exposition

For further information, you are invited to inquire at the Keeney Publishing Co. — publisher of Heating, Piping & Air Conditioning and American Artisan — exhibit in Booth No. 425

MAIN FLOOR exhibit booths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BURGESS-MANNING CO., Architectural Products Div., 5970 Northwest Highway, Chicago 31, Ill.—Booth 2-700

In attendance: D. W. Day, Sherman J. Larsen, Warren C. Kadow, Albert T. Jorn, J. G. Baran.

Exhibiting: Radiant heating, radiant cooling, acoustic control ceiling. Exhibit will feature radiant heating panels and radiant cooling panels in operation.

BURNHAM CORP., Boiler Div., Irvington, N. Y.—Booths 1036, 1038

In attendance: F. R. Brophy, V. A. Good, D. W. Stevens, H. N. Jones, W. Enochs, R. Green, R. Henderson, R. W. Fowler, R. Eisbrenner.

Exhibiting: "Hy-Power Mode-Baseray" radiant baseboards; radiant radiator; "Pacemaker" oil boiler and oil heating unit; "Yello-Jkt." oil boiler and oil heating unit; "P B" series gas boiler. Gas boiler and "Super" tankless built-in water heaters with capacities for from one to five baths will be featured.

BUSH MFG. CO., 179 South St., West Hartford 10, Conn.—Booths 126, 128

In attendance: Cecil Boling, E. M. Flannery, F. T. Carney, J. A. Mulcahey, J. K. Campbell, B. Prather, H. Theis, J. Sheperdson, George Finck, H. L. Quinn, Joe E. Parker.

Exhibiting: Air handling units, water cooling tower, and steam coils, and featuring baseboard radiation, convectors, and industrial fin tubing and covers.

CAREY MFG. CO., PHILIP, Lockland, Cincinnati 15, Ohio—Booth 2-440

Exhibiting: "Careyduct", industrial insulations—"Tempcheck"; "Careycel", MW50. Non-metallic duct for all purposes will be featured.

CARNES CO., W. R., S. Main St., Verona, Wis.—Booth 2-336

In attendance: W. R. Carnes, Roger Whiting, F. A. Freese, Robert Troller, John Frosch.

Exhibiting: Ceiling air diffusers, power roof ventilators.

CARRIER CORP., 302 S. Geddes St., Syracuse 1, N. Y.—Booths 227, 229, 231, 233

CARVER PUMP CO., Muscatine, Ia.—Booth 105

CENTURY ELECTRIC CO., 1806 Pine St., St. Louis 3, Mo.—Booth 1225

In attendance: R. N. Hill, G. C. Henderson, F. Powers, A. Neher, L. H. Downing, Geo. Nafe, G. E. Moe, R. L. Biller, H. McInerney.

Exhibiting: Complete line of motors used in the heating and ventilating field. New three speed fan motor will be introduced. A demonstration unit illustrating insulation process will also be shown. A home workshop motor is to be given away each day of the show.

CENTURY ENGINEERING CORP., 401 Third St., S. E., Cedar Rapids, Ia.—Booth 827

In attendance: B. J. Lattner, W. S. Moellering, J. O. Rosche, Charles Walker, Ace Mellott, R. F. Considine, Harold Potter, Thos. R. Bridge, James Hastie, M. F. Keiderling.

Exhibiting: Oil fired winter air conditioners, basement type and "Hiboys"; oil fired counterflow units; gas fired counterflows; gas fired winter air conditioners, basement and "Hiboy" types; oil and gas gravity furnaces; oil fired hot water boilers; oil fired domestic hot water heaters (pressure gun type burner); conversion oil burners; conversion gas burners; air washer-humidifiers. New oil and gas counterflow approved by AGA and Underwriters' Laboratories for zero clearance and installation on combustible floors, and air washer-humidifier that can be installed in almost any make of oil or gas basement type furnace, will be featured.

CERTIFIED FURNACE CO., 1000 Berry Ave., St. Paul 4, Minn.—Booth 2-105

In attendance: M. W. Bowen, D. C. Rupp, J. C. Stroud, H. E. Hansen, C. W. Byrum, S. T. Carlsen, R. H. Pentecost, C. E. Nelson.

Exhibiting: Coal, oil and gas fired all steel winter air conditioning units. New "Bonus Built" line of oil fired all steel winter air conditioning units will be featured.

CHACE CO., W. M., 1600 Beard Ave., Detroit 9, Mich.—Booth 346

CHAR-GALE MFG. CO., 4325 Hiawatha Ave., Minneapolis 6, Minn.—Booths 108, 110

In attendance: L. C. Johnston, C. L. Johnston, N. J. Dovolis, Jess Bratsch, Joe LaTuff, Harley Sipprell, George S. Standen, R. W. Thorne, Earl R. Johnston.

Exhibiting: Aluminum air conditioning and heating ducts, fittings, pipe and ells, registers, vents, and humidifiers. "Gale-Aire" 4½ in. small pipe system, together with register combination, will be displayed under actual operating conditions.

CHELSEA FAN & BLOWER CO., INC., 639 South Ave., Plainfield, N. J.—Booth 1006

In attendance: George J. Read, James B. Hebert, William J. Lohman, Jr., William J. Lohman, Sr., Eugene W. Lohman.

Exhibiting: Duct booster fans; air blasters; mancoolers, power roof ventilators, industrial fans; attic fans. Window fans and room air conditioners will be featured.

CHICAGO BLOWER CORP., 9867 Pacific Ave., Franklin Park, Ill.—Booth 1307

In attendance: F. H. Gohl, V. Launspach, W. Swain, T. W. McManus.

Exhibiting: Turbo-pressure blower; steel plate exhauster; multi-blade exhauster; "Gyra-Flo" roof exhauster; "Axial-flo" roof exhauster; axial airfoil propeller fan; ventilating set. New airfoil bladed type backwardly curved centrifugal fan, with efficiencies in excess of 90 percent, a steep pressure characteristic curve and a low noise level rating will be featured.

CHICAGO PUMP CO., 622 Diversey Pkway., Chicago 14, Ill.—Booth 835.

In attendance: G. D. Bers, Milton Spiegel, H. E. Martin, A. R. Kral, John C. Redmond, William Hanley, Jerry Lettvin, Dave Boyell, John L. Alexander, William Allan, S. F. Resan, Edwin C. Anderson, E. J. Anderson, Roger D. Anderson, Hugh C. Boisclair, Robert E. Bragg, E. C. Cooley, Jr., J. W. Cherry, F. E. Baird, L. S. Gilbert, Vance A. Morrow, H. M. Ludlow, J. M. MacCrea, A. A. Maycock, R. D. Elgin, Henry L. Pelouze, B. G. Arnold, D. R. Rippey, R. K. Rothrock, James A. Scherer, C. F. Sexton, Paul R. Jarratt, Harry B. Hoffman, Louis B. Hoffman, F. X. Loeffler, Sr., J. J. Heilman, A. L. Vanderhoof.

Exhibiting: Complete line of circulating pumps for air conditioning and building water systems; complete line of pumps for every type of heating service; sewage ejectors and bilge pumps

CHRYSLER CORP.—see AIRTEMP DIV.

CLARAGE FAN CO., Kalamazoo, Mich.—Booths 1028, 1030

In attendance: R. A. Wasson, S. H. Downs, C. R. McConner, C. O. Fury, T. Cranage, J. W. Muessig.

Exhibiting: Industrial exhaust fan (700 F construction); ventilating unit (ready-to-run type); high speed ventilating fan.

CLAYTON & LAMBERT MFG. CO., 1701 Dixie Highway, Louisville 10, Ky.—Booth 2-240

In attendance: Wm. M. Pace, R. J. Miller, John B. Henderson, Claude F. Forbes, William Yeager.

Exhibiting: "Lamneck" furnace pipe and fittings; storage type water heaters; "C & L" torches and tinners furnace. Exhibit will feature first showing of automatic storage water heaters being manufactured for distribution through the heating and ventilating trade.

CLEAVER-BROOKS CO., 326 E. Keefe Ave., Milwaukee 12, Wis.—Booths 2-119, 2-121

In attendance: H. F. Holtz, E. D. Langley, E. H. Pollnow, F. A. Hopp, R. J. Tutsch, T. P. Dyke, F. W. Kramer, D. E. Kress, E. P. Homa, J. V. Resek, W. DeMuth, Howard McCoy, Frank Wymbs, T. M. Walczak, Cyril Meenan, K. Carhart.

Exhibiting: 80 hp "Model LR" boiler; "HEV-E" gas and oil burner equipment.

CLEVELAND HEATER CO.—see AIR CONTROLS, INC. DIV.

COAL-O-MATIC CO., Trucksville, Pa.—Booths 1309, 1311, 1313, 1315, 1317, 1321 (Anthracite Institute exhibit)

In attendance: Paul L. Gross, Edw. T. Nahill.

COLEMAN CO., INC., 250 N. St. Francis, Wichita 1, Kans.—Booths 1106, 1108.

In attendance: Sheldon Coleman, C. L. Burrows, L. M. Marks, Jess Moore, A. W. Boyer, F. W. Richards, Jack Kice.

Exhibiting: Air conditioning (heating and cooling), two new lines; "Blend-Air" warm air furnaces for use with 3½ in. small pipe system or conventional duct system; new line of six gas-fired wall heaters; floor furnaces, both gas and oil fired models; "Vit-rock" lined gas and oil fired water heaters; gas and oil fired space heaters. Premier showing of new 20 min sound color film, "The Trend Everywhere", will be featured as will "Vu-Graph" presentation of nationwide trend survey to determine preferences in design and air conditioning of small homes.

COLE-SEWELL ENGINEERING CO., 2288 University Ave., St. Paul 14, Minn.—Booth 103

In attendance: E. W. Laudert, Richard Sabor, H. J. Sewell.

Exhibiting: Draft controls, "Laund-R-Vents."

COLUMBIA BURNER CO., 729 Ewing St., Toledo 7, Ohio—Booths 230, 232

In attendance: Arnold A. Muenzer, R. J. Krutsch.

Exhibiting: Complete line of gas conversion burners for domestic and commercial use; gas designed "Conditioneer" furnaces; gas gravity furnaces. Gas furnaces of gravity and forced air type and a new conversion burner with air cushioned flame will be featured.

COMBUSTION CONTROL CORP., 720 Beacon St., Boston 15, Mass.—Booths 538, 540

In attendance: L. D. Sibley, P. K. Ryder, P. P. Foglio, H. C. Christiansen, R. W. Crawford, A. Lovendahl.

Exhibiting: "Fireye" flame failure safeguard controls for both manually ignited and automatic gas, oil or combustion gas-oil burners; smoke indicating equipment. Manual and automatic burner system used with new "Firetron" scanner, which sees all flames and eliminates need for photoelectric and flame rod scanners, will be featured.

COMBUSTIONEER DIV., STEEL PRODUCTS ENGINEERING CO., 1205 W. Columbia St., Springfield, Ohio—Booths 1327, 1329, 1331

In attendance: J. W. Albright, C. S. Overcashier, R. F. Kissell, Wm. A. Sayler, Del Getz, P. H. Chamberlain, H. E. Gahnz, Georges Roudanez, O. J. Puckett, C. P. Meredith, R. Hedges, E. M. May, A. F. Ludolph, Frank Doyle, John McCarthy, M. H. Collins, R. L. Tabb, J. H. Lavin.

Exhibiting: Low pressure oil burner; high pressure oil burner, conversion gas burner; gas furnace, oil furnace; bin feed and hopper stokers; humidifier. Exhibit will feature first showing of new two-stage, self-purging low pressure oil burner, and there will be a plastic working model of new two-stage fuel pump.

COMMERCIAL FILTERS CORP., 2 Main St., Melrose 76, Mass.—Booth 324

In attendance: J. R. Chisholm, R. L. Fielding, H. C. Corwin, H. A. Wilson, P. R. Matravers.

Exhibiting: Filters for home and industrial heating oils, for the distribution of petroleum products and for the clarification of boiler water. A featured item will be a demonstration of the manner in which a standard oil burner model of "Fulflo" filter can be connected in a simple manner to any boiler for a steam or hot water system to give boiler water "of crystal clarity," thereby increasing thermal efficiency by preventing formation of heat wasting scale and in many cases eliminating objectionable water-hammer.

COMMITTEE ON STEEL PIPE RESEARCH, AMERICAN IRON & STEEL INSTITUTE, 350 5th Ave., New York 1, N. Y.—Booth 924

In attendance: George D. Lain.

Exhibiting: Steel pipe. Its use in radiant heating and snow melting installations will be featured.

CONCO ENGINEERING WORKS, P. O. Box 111, Mendota, Ill.—Booths 1229, 1231

In attendance: J. W. Burch, F. C. Lenihan, J. A. Howarth, R. W. Corbett, R. W. Conkey, W. G. Van Etten, R. W. McKenzie, W. G. Momeny, D. L. Bader, A. B. Carlson, O. R. Schmidt, R. E. Schmielau, R. L. Garland, J. H. Rutishauser, J. W. Osgood, W. A. Schultz, J. T. Wells, Herman Kleckner, F. J. Blotch, A. J. Krenz, L. A. Page, Lee Davignon, Roy H. Case, C. A. Carlson, Harry O. Donnelly, Dan Lynch, Steve Rilling, Walter R. Fresne, Harold A. Fresne, George H. Hosmer, E. A. Phillips, R. J. Mulholland, W. F. Hirsch, Paul Oehler, Vic Page, Orville L. Lobb, Miles A. Towne, R. Harry Crabtree, H. D. Conkey.

Exhibiting: Oil and gas fired warm air heating equipment — forced air and gravity, conversion burners. Furnaces will include counterflows, hi-boys and lo-boys. Summer and winter complete conditioning equipment will be featured.

CONDENSATION ENGINEERING CORP., 3511 W. Potomac, Chicago 51, Ill.—Booth 916

In attendance: Wayne Limbert, B. A. Johnson, Tom Jones, Walt Aschliman, Bob Wasson, George Anderson.

Exhibiting: "Vitroliner" prefabricated chimneys and chimney lining pipe.

CONGRESS DRIVES DIV., TANN CORP., 3750 E. Outer Drive, Detroit 34, Mich.—Booth 330

In attendance: Stuart Chosid, Otis L. Johnson, Albert C. Dueweke.

Exhibiting: Pulleys, V-belts, shaft collars, clutches.

CONNOR ENGINEERING CORP., Danbury, Conn.—Booths 208, 210

In attendance: J. H. Bartol, H. A. Baker, T. L. Smith.

Exhibiting: "Dorex" air recovery systems. "Kno-Draft" commercial and industrial air diffusers; "Kno-Draft" residential air diffusers for overhead heating and year 'round home conditioning. High pressure type equipment (air diffusers) together with new residential air diffusers for year 'round home conditioning will be featured.

CONTINENTAL AIR FILTERS, INC., 2520 Helm St., P. O. Box 1647, Louisville, Ky.—Booths 112, 114.

In attendance: Wm. K. Gregory, Frank B. Johnston, Jr., John A. Taylor, Jr., S. S. Emison, Ray L. Craig, Willis S. Veits, L. P. Bryant.

Exhibiting: Automatic self-cleaning air filters; "E-Z-Wash" cleanable unit filters.

COOLERATOR CO., 128 W. 1st St., Duluth 1, Minn.—Booth 2-609

COPELAND REFRIGERATION CORP., Sidney, Ohio—Booth 843

In attendance: H. E. Thompson, F. J. Gleason, O. H. Buschmann, C. L. Curtis, W. G. Von Meyer, R. G. Berg, D. H. Bodine, F. E. Jernberg, A. E. Cadwell.

Exhibiting: Refrigerating units and compressors for air conditioning systems. "Copelametic" units and motor compressors through 7½ hp will be featured.

CORY CORP., 221 N. La Salle St., Chicago 1, Ill.—Booth 2-918

CRANE CO., 836 S. Michigan Ave., Chicago 5, Ill.—Booths 212, 214, 216, 220

In attendance: E. Allen, E. Cole, G. L. Erwin, Jr., G. G. Lindholm, H. J. Wulf, H. J. Stift, W. D. Howard, C. E. Towner, C. A. Stauber, D. A. Brown, W. G. Kehm, H. H. Simmons, J. L. Holloway, W. A. Burbine, C. T. Pollock, J. A. Dwyer.

Exhibiting: Gas and oil fired boilers; oil and gas fired furnaces for basement and ground level installation; gas fired unit heaters; individual room air conditioner; cast iron convector and standard type baseboard radiation; valves and fittings. A vertical type gas fired downflow ranch house furnace which lends itself to installations in small utility rooms and utility closets, and an operating baseboard radiation display demonstrating the fast heat pickup and moderate operating temperature, will be featured.

CRISE CONTROLS DIV., ACRO MFG. CO., 2040 E. Main St., Columbus 16, Ohio—Booth 2-510

In attendance: F. P. Maxwell, F. G. McCloskey, E. V. Bishoff, M. S. Feltz, John Stranberg, Thomas A. Smith, Al Unetic.

Exhibiting: Fan and limit controls for gas, oil and coal fired equipment; zone control system; automatic damper regulator set for hand fired furnaces; motors for louver operation. New line of "Surfastat" fan and limit controls and new zone control system will be featured.

CROSLEY DIV., AVCO MFG. CORP., Cincinnati, Ohio—Booth 2-405

CURTIS REFRIGERATING MACHINE DIV., 1905 Kienlen Ave., St. Louis 20, Mo.—Booths 234, 236, 238, 335, 337, 339

In attendance: H. J. Nettler, N. H. Behrend, M. P. Moeller, M. A. C. Weber, F. J. Hanley, K. T. Rockey, G. C. Helde, J. E. Mead, Mason Emanuels, K. E. Schneider, V. P. Warren, C. L. Angell, H. K. Hecker, H. J. Kipp, H. C. Morrison.

Exhibiting: Packaged air conditioning units; commercial condensing units. Special unit designed for use with warm air furnace as used in home, window type air conditioning units, and liquid petroleum gas transfer units will be featured.

CUTLER-HAMMER, INC., 315 N. 12th St., Milwaukee 1, Wis.—Booths 2-704, 2-708

DAFFIN MFG. CO., Lancaster, Pa.—Booth 2-1010

In attendance: B. W. Dickinsen, P. A. Herr, G. E. Sprackling.

Exhibiting: Humidifiers; new warm air furnace humidifier. New plenum humidifier (with positive output) will be featured.

DAVIDSON FAN CO., 213 California St., Newton 58, Mass.—Booth 1126

In attendance: John F. Snow, E. F. Patterson, F. E. Coolidge, R. E. Mabey, E. H. Taze, C. E. Parmelee, H. M. Flaherty, M. K. Rush, T. R. Wiley, R. W. Hanson, D. S. Preston, F. G. Phipps, G. V. Sutfin, A. W. Nugent.

Exhibiting: Roof exhaust fan equipment and accessories. Exhibit will feature "Hyduty" roof fan incorporating newly developed slow speed wheel, which maintains high capacity at substantially reduced fan speeds and is just being placed on the market for general distribution.

DAYTON RUBBER CO., 2342 Riverview Ave., Dayton 7, Ohio—Booth 2-132

In attendance: L. C. Strobeck, J. W. Torrant, T. W. Peterson, Geo. Rothe, L. D. Werntz, M. E. Runner, J. D. Hershey, L. J. Adams, J. R. Young, Norm Lever, T. J. Ehrhart.

Exhibiting: "Thorobred" V-belt, "Cog-Belt".

DEBOTHEZAT FANS DIV., AMERICAN MACHINE & METALS, INC., East Moline, Ill.—Booths 130, 132

In attendance: Fred S. Bailey, Ray Bouslough, M. Beline, C. J. Gaspar.

Exhibiting: Induced draft "Bifurcator" fan; power flow roof ventilator; "Bifurcator" duct fan; stainless steel high temperature fan wheels. Induced draft "Bifurcator" stack fan will be featured.

DELAVAN MFG. CO., 3007 6th Ave., Des Moines, Ia.—Booth 506

In attendance: David T. Morgenthaler, E. O. Olson, H. L. McNally.

Exhibiting: Oil burner nozzles and accessories; spray nozzles for cooling towers, evaporative condensers, humidifying, and industrial applications; "Hally" nozzle filters; flame inspection mirrors; oil burner service kits; sludge solvent. New nozzles for air conditioning applications will be featured.

DELTA HEATING CORP., 1 Cole St., Trenton 8, N. J.—Booth 2-1018

In attendance: A. L. Nathan, R. C. Hauck, J. Polland, Wm. Schonfeld.

Exhibiting: Oil and gas fired furnaces (winter air conditioners); oil horizontal type furnaces; oil floor and wall type furnaces; oil and gas gravity furnaces; year 'round air conditioners. New gun type oil floor furnace with circulating fan, operating demonstrator model, and new furnace air conditioning unit, 2 ton size in operation, will be featured.

DETROIT CONTROLS CORP., 5900 Trumbull Ave., Detroit 8, Mich.—Booth 815

DETROIT REGULATOR CO., 1742 Rivard St., Detroit 7, Mich.—Booth 1221

In attendance: Frank Kern, Jr., Charles Stang, Jr., Frank Voakes, D. L. Zorn, Lyle Cornwell, Stan Klots.

Exhibiting: Entire line of "Maxitrol Straight-Thru-Flow" low pressure gas appliance regulators, used primarily on domestic heating appliances but also finding application on commercial and industrial equipment. Model RV 10-⅛" pilot pressure regulator, put into production during September 1952 and designed specifically for the purpose of providing pressure control on gas pilot flames, will be featured. It is finding useful application on conversion burners, furnaces, boilers, unit heaters, water heaters, ranges, refrigerators, and other domestic gas-fired appliances.

DEVICES, INC., 214 E. 53rd St., New York 22, N. Y.—Booth 910

In attendance: V. L. Yepsen, B. LeB. Musgrave, Sam R. Adamson, Hank Schmitz, Charles Brown.

Exhibiting: "Miracle" surface anchors and adhesives. "Z" clips used — for example — to attach aluminum foil insulation board to masonry wall and to afford a base for anchoring air conditioning units will be featured.

DODGE CORP., F. W., 119 W. 40th St., New York 18, N. Y.—Booth 342

DOERR ELECTRIC CORP., 50 N. 3rd Ave., Cedarburg, Wis.—Booths 2-206, 2-208

In attendance: J. H. Park, Carl F. Kowal, H. E. Ellis, Roger Polzin, Lee A. Doerr, Edwin Doerr, Emmett J. Doerr, E. J. Baumann.

Exhibiting: Fan motors; special blower motors, motors for air conditioning circulating pumps and unit heater motors. Newly designed line of motors for fan duty applications, and special 3-lead, 2-speed motor will be featured.

DOLE VALVE CO., 1901-1941 W. Carroll Ave., Chicago 12, Ill.—Booth 1120

In attendance: John L. Dole, Robert M. Ellis, J. F. Lund, Wm. Pennington, Wm. Wallin, Henry Aronson, Stuart G. Phillips.

Exhibiting: Air valves; tempering valves; automatic registers for forced warm air heating systems; water flow control valves; combination automatic hot water air valves and air chambers. New, improved, lower priced automatic register for forced warm air heating systems, and chamber vent valves, will be featured.

DOMESTIC ENGINEERING, 1801 Prairie Ave., Chicago 16, Ill.—Booth 1121

Exhibiting: Publication

DONGAN ELECTRIC MFG. CO., 2987-3001 Franklin St., Detroit, Mich.—Booth 2-518

DOWAGIAC STEEL FURNACE CO., 110-112 Beeson St., Dowagiac, Mich.—Booth 2-219

DOYLE VACUUM CLEANER CO., 225 Stevens St., S. W., Grand Rapids 2, Mich.—Booth 2-212

In attendance: Dewey I. Doyle, Jr., H. F. Arnold, L. F. Hodgins, J. G. Maher.

Exhibiting: Furnace vacuum cleaners.

DRAVO CORP., Heating Dept., Dravo Bldg., 5th & Liberty Aves., Pittsburgh 22, Pa.—Booth 2-339

In attendance: W. L. Davidson, R. C. Black, F. S. Lappin, T. W. Eshbach, J. F. O'Hanlon.

Exhibiting: "Counterflo" space heater. Exhibit will feature the five applications for these heaters — (1) comfort space heating; (2) process drying; (3) heat curing; (4) pretempering makeup air; (5) air conditioning and temporary space heating.

DRAYER-HANSON, INC., Box 2215 Terminal Annex, Los Angeles 54, Calif.—Booth 2-524

DREIS & KRUMP MFG. CO., 7400 Loomis Blvd., Chicago 36, Ill.—Booth 242

In attendance: Vincent Bellik; Jack I. Anderson, John Kutscheid, Al Muranko, J. A. Schaefer.

Exhibiting: Hand brakes; press brakes; dies and attachments; special bending brakes and tools. New bench type universal box and pan brake will be featured.

DUNHAM CO., C. A., 400 W. Madison St., Chicago 6, Ill.—Booths 434, 436, 438

In attendance: J. W. O'Neil, Jane Butler, G. A. Mansinger, W. S. Browning, H. S. Marshall, D. B. Stockdale, J. W. Jungels, J. S. Greggory.

Exhibiting: Baseboard, convector and finned tube radiation; propeller fan, blower and gas fired unit heaters; vacuum and condensation pumps; traps, valves and other specialties. "Vari-Vac" differential system and "Metro" method of piping. Gas fired unit heaters and duct furnaces will be featured, and display will be built around the exhibitor's 50th anniversary theme.

DURANT INSULATED PIPE CO., Warren Way off Bay Rd., Palo Alto, Calif.—Booth 1226

In attendance: Wm. H. Buck, P. W. Neely, Wm. R. Funk.

Exhibiting: Prefabricated insulated pipe conduit and accessories. Latest developments and improvements — principally as regards multiple pipe units, anchor and terminal devices — will be featured.

DURODYNE CORP., 38 S. Franklin St., Hempstead, N. Y.—Booth 2-919

In attendance: Martin M. Gracer, Julius R. Gracer.

Exhibiting: "Duro-Blade" hardware used in the fabrication of multi-blade dampers and fire dampers, which allows sheet metal shop to fabricate dampers; "Vane-Runners" used in the fabrication of single blade turning vanes.

DWYER MFG. CO., F. W., 317 S. Western Ave., Chicago 12, Ill.—Booth 1008

In attendance: F. W. Dwyer, J. G. Dwyer.

Exhibiting: Draft gages; manometers; pitot tubes; combustion test sets, smoke gages, air filter gages.

ECKHART MFG. CO., INC., 931 Lehigh Ave., Union, N. J.—Booth 125

In attendance: Arnold Eckhart, Sr., Arnold Eckhart, Jr., Walter E. Eckhart.

Exhibiting: "Silent Korth" oil burners in capacities from 0.60 to 20 gph.

ECONOMY PUMPS—see WHEELER ECONOMY

EDDINGTON METAL SPECIALTY CO., Eddington, Pa.—Booths 2-332, 2-334

ELECTRIC FURNACE MAN, INC., Emmaus, Pa.—Booths 1315, 1317, 1321

ELECTRIGLAS CORP., Bergenfield, N. J.—Booth 2-238

In attendance: Leon Appleman, Kenneth Appleman, Arthur M. Wyatt, Harry Rowe.

Exhibiting: Radiant heating panels for primary and supplementary heating in homes, offices, factories, etc. wall panels; baseboard panels; "Longline" ceiling panel; "500" ceiling panel; suspended ceiling panel; "Thermolite" ceiling heat-light unit. Ceiling panel, especially for new construction, to give dropped ceiling built-in effect will be featured.

ELECTRO-THERM, INC., 931 Selim Rd., Silver Spring, Md.—Booth 2-901.

In attendance: S. J. Hayden, L. H. Buffam, C. B. Mullowney.

Exhibiting: Electric heating elements for oil burner preheaters; air conditioning "Freon" foam removal units; crankcase compressor oil heating elements; automatic heating elements with integral thermostats for industrial applications; multiple rod heating elements up to 50 kw.

EMERSON ELECTRIC MFG. CO., 8100 Florissant Ave., St. Louis 21, Mo.—Booth 920

In attendance: O. O. Metz, W. H. Thias, T. J. Egan, F. J. Tullman, O. P. Zenz, F. C. Weaver, R. H. Buss, E. R. Krueger, E. C. Gaskill.

Exhibiting: Motors, 1/20 to 5 hp; hermetic motor parts, 1/8 to 15 hp; exhaust fans. High speed hermetic motors for air conditioning equipment, small and light in weight with hp ratings corresponding to present motors, will be featured.

ENGEL SHEET METAL EQUIPMENT, INC., 3001 N. Union, St. Louis 15, Mo.—Booth 2-1005

EUREKA-WILLIAMS CORP., 1201 E. Bell St., Bloomington, Ill.—Booths 2-430, 2-432, 2-434, 2-436

In attendance: C. S. Stackpole, A. F. Ward, T. H. Green, A. L. Agne, C. G. Branch, Gilbert Bird, Wm. York, Hal Hurston, Ralph Holmberg.

Exhibiting: "Oil-O-Matic" and "Gas-O-Matic" home heating equipment, and featuring residential air conditioning.

EXCELSIOR STEEL FURNACE CO., 118 S. Clinton St., Chicago 6, Ill.—Booth 2-441

In attendance: A. B. Glessner, J. S. McDonald, P. Crowley, E. Jaroch, W. R. Lawson, J. McKinley, W. Schultz, C. Blodgett.

Exhibiting: Furnace pipe and fittings of all types; stainless steel chimney liners. High velocity small pipe line of galvanized fittings will be featured.

FAIRBANKS CO., 393 Lafayette St., New York 3, N. Y.—Booths 141, 143

In attendance: Edmund T. Flanagan, A. T. Wendler, W. O. Keneipp, R. R. Huegli, C. E. Elder, C. G. Long, W. B. Crane, W. H. Peate, P. M. Fallon.

Exhibiting: Bronze and iron body valves; "Dart" malleable iron unions; "Pic" steel unions; steel casters, "Lockweld" swivel and matching rigid two wheel and platform hand trucks; wheels. "Bantamweight" platform trucks (new lightweight hand truck) will be featured.

FARR CO., P. O. Box 10187, Airport Station, Los Angeles 45, Calif.—Booth 907

In attendance: J. D. McCampbell, G. R. Holtz, J. S. Powell, E. Kirkpatrick.

Exhibiting: "Far-Air" self-washing filter; filter; grease eliminator; "Golden Rotor" evaporative cooler; engine compressor filter. A moving display featuring the self-washing filter will be featured.

FASCO INDUSTRIES, INC., P. O. Box 509, Rochester 2, N. Y.—Booth 1020

FEDDERS-QUIGAN CORP., 57 Tonawanda St., Buffalo 7, N. Y.—Booth 1143

In attendance: C. W. Little, G. M. Meyer, A. J. DeFino, S. Giordano, A. F. Ihde, F. E. Kahler, E. E. Humphrey, W. E. Zielonka, J. I. Woodworth, W. K. Smith, J. P. Divizio, E. Twelves, R. W. Morgan, L. J. Sahs, J. P. Guerra, H. Mould, R. E. Cassatt, F. A. Mitchell, H. Brockway, V. LaRussa.

Exhibiting: Baseboard radiation; convector radiators featured in decorator colors; wall radiation; unit heaters; dehumidifiers; room air conditioners and water coolers. Features include a completely new unit heater, convector radiators to blend with any color selected for interior decoration, and new line of air conditioners redesigned and restyled for 1953, with "Weather Bureau" with "pushbutton weather" as the main theme.

FEDERAL BOILER CO., INC., Midland Park, N. J.—Booths 2-318, 2-320

In attendance: James Legg, Roy Rathe, Mr. Allstrom, Walter Kingsberry, I. Holland, Roy Bohn

Exhibiting: Complete line. "UGF" series, AGA approved for gas operation, including the use of copper domestic internal tankless coils rated from 76,800 Btu to 104,000 Btu net output, available as a prefabricated package, will be featured.

FIELD CONTROL DIV., H. D. CONKEY & CO., Mendota, Ill.—Booth 1024

In attendance: C. W. Potter, H. J. Potter, Lee Beardsley, E. A. Field.

Exhibiting: Barometric draft controls, and featuring new double acting gas control.

FITZGIBBONS BOILER CO. INC., 101 Park Ave., New York 17, N. Y.—Booths 101, 102

In attendance: P. K. Addams, G. E. Olsen, J. R. Collette, G. Nelligann, W. O. Spiess, F. W. Harmer, M. F. May~~, R. Wevang~~.

Exhibiting: Improved "R-Z-U Junior" boiler, with burner, controls, trim; "80" series boiler, with burner, controls, trim; scotch type boiler; "400" series residential boiler-burner unit; new, improved "Tanksaver" instantaneous hot water coil.

FOOD MACHINERY & CHEMICAL CORP.—see PEERLESS PUMP DIV.

FOREST CITY FOUNDRIES CO.—see NIAGARA FURNACE DIV.

FREEMAN STOKER DIV., ILLINOIS IRON & BOLT CO., 914 S. Michigan Ave., Chicago 5, Ill.—Booth 2-431

FRICK CO., West Main St., Waynesboro, Pa.—Booths 119, 121

In attendance: C. C. Smith, G. E. Elden, W. O. Kline, J. A. Etter, R. M. Shuford, H. F. Burpee, V. J. Sparks, C. P. Goree, P. A. Willis, A. E. Roebke, P. H. Buch.

Exhibiting: "Eclipse" four cylinder compressor, cut-away and in slow motion; nine cylinder compressor; 5 hp unit air conditioner; machine parts, new safety valve, etc.

FRIGIDAIRE DIV., GENERAL MOTORS CORP., 300 Taylor St., Dayton 1, Ohio—Booths 511, 513, 515, 517

In attendance: C. F. Wood.

Exhibiting: Self-contained air conditioners; window unit room air conditioners; water coolers; dehumidifier; refrigeration compressors; cooling coils. Central system residential air conditioner combining cooling and heating for year 'round use, and central system residential air conditioner for cooling complete home, will be featured.

FUELOIL & OIL HEAT, 2 W. 45th St., New York 19, N. Y.—Booth 947

Exhibiting: Publication

FULTON SYLPHON DIV., ROBERTSHAW-FULTON CONTROLS CO., Knoxville 4, Tenn.—Booth 106

In attendance: E. T. Cato, N. W. Barnes, L. D. Jones, L. S. Dysart, E. D. Rogers.

Exhibiting: Temperature controls; pressure controls; automatic radiator valves, expansion joints. New expansion joint for baseboard type hot water heating systems will be featured.

GALLAHER CO., 4108 Dodge St., Omaha 3, Neb.—Booth 2-309

GAS HEAT, 2 W. 45th St., New York 19, N. Y.—Booth 947

Exhibiting: Publication

GENERAL AUTOMATIC PRODUCTS CORP., 2300 Sinclair Lane, Baltimore 13, Md.—Booths 2-410, 2-412

In attendance: Walter R. Way, Harold F. Browning, Chas. E. Hight, H. J. Hughes, Robert E. Lee.

Exhibiting: Gas fired and oil fired warm air units; baseboard radiation.

GENERAL BLOWER CO., 8610 Ferris Ave., Morton Grove, Ill.—Booths 2-324, 2-326

In attendance: Wm. W. Meyer, H. R. Johnston, R. P. Scott, J. Wind, Wm. Chum, S. Klocek.

Exhibiting: Centrifugal fans; blowers and exhausters; turbo blowers; welding fume exhausters; steel plate exhausters; inlet valve control.

GENERAL CONTROLS CO., 801 Allen Ave., Glendale 1, Calif.—Booth 1206

In attendance: J. F. Ray, F. Weldon, B. Lerch, W. Kell, R. Weber, H. Lindstrom, H. Smith, R. Strongman, H. Safford.

Exhibiting: Heating, ventilating and air conditioning controls. Mercury switch thermostat and "super-powered" heat control package set will be featured.

GENERAL ELECTRIC CO., AIR CONDITIONING DIV., 5 Lawrence St., Bloomfield, N. J.—Booths 145, 247

In attendance: F. J. Van Poppelen, L. E. Thompson, G. W. Hart, S. J. Levine, R. C. Robertson, W. L. Sneltjes, G. K. Iwashita, W. F. R. Karsten, J. J. Heffernan.

Exhibiting: Air conditioning units; boilers—oil and gas; cooling equipment—home and commercial; furnaces—oil and gas; water cooling—water coolers. Year 'round residential air conditioning line; "Air-Wall" heating and cooling system; new downflow and horizontal furnaces; boiler display; packaged air conditioner; and commercial water cooler working model cutaway will be featured.

GENERAL ELECTRIC CO., APPARATUS SALES DIV., 1 River Rd., Schenectady 5, N. Y.—Booth 2-221

In attendance: W. T. Goldsmith, P. Gomez, R. D. Tyler, W. F. Brunner, C. J. Ossenfort, C. D. Pease, J. B. O'Connor.

Exhibiting: Complete line of heating controls; line of fractional hp motors for the industry. Heating controls will be featured.

GENERAL FILTERS, INC., 12890 Westwood Ave., Detroit 23, Mich.—Booth 525

In attendance: Robert G. Gregory, Roland A. Redner, Mrs. Grace Redner.

Exhibiting: Complete line of fuel oil filters for both light and heavy fuel oils; soot remover; hydraulic and lubricating oil filters. New filter for heavy fuel oils will be featured.

GENERAL GAS LIGHT CO., 202 N. Park St., Kalamazoo, Mich.—Booth 2-818

In attendance: A. H. Humphrey, R. P. Humphrey, W. H. Jackson, Nat Blinks, C. G. Weirs.

Exhibiting: "Humphrey" unit heaters (gas fired); circulators (gas fired), "Radiantfires".

GLASFLOSS, 155 E. 44th St., New York 17, N. Y.—Booth 315

In attendance: R. R. Pryor, W. E. Grasberger.

Exhibiting: Standard throw-away air filters; "I-S" impingement-strainer air filters; filter media.

GLYCOLATOR DIV., IRON CITY CHEMICAL CO., Valencia, Pa.—Booth 915

In attendance: Robert G. Schmidt, A. W. Iams, George C. Hein, W. Gans.

Exhibiting: Furnace "Glycolator"; Monarch "Glycolator"; Royal "Glycolator"; Regal "Glycolator"; Rex "Glycolator"; commercial "Glycolators". New model furnace and Royal "Glycolator" will be featured.

GOODFELLOW CO., INC., E. D., 496 E. Bodley Ave., Memphis 6, Tenn.—Booth 2-439

In attendance: Robert Colmer, F. E. Conaway, C. E. Goodfellow, E. D. Goodfellow.

Exhibiting: Steel cased induced draft cooling towers; direct connected centrifugal pumps. New line of high efficiency direct connected centrifugal pumps for air conditioning, refrigeration and similar applications will be featured.

GOULDS PUMPS, INC., 200 Fall St., Seneca Falls, N. Y.—Booth 2-114

In attendance: W. J. Howell, Paul Thompson, B. F. Barnett, C. L. Forshee, P. J. Olmstead, F. G. Paffrath.

Exhibiting: New group of horizontally split case, single stage centrifugal pumps; new line of small centrifugals particularly adaptable for air conditioning; other pumps, such as stainless steel centrifugals, etc.

GOVERNAIR CORP., 513 N. Blackwelder, Oklahoma City 4, Okla.—Booth 2-619

GREENLEE TOOL CO., 2136 12th St., Rockford, Ill.—Booths 531, 533

In attendance: R. J. Samuelson, A. H. Hawkinson, P. E. Chappel, R. W. Stevenson, R. D. Rayburn.

Exhibiting: Hand and power operated hydraulic pipe pushing machines for underground construction; mechanical hand benders; hand and power operated hydraulic benders; various types of boring tools of interest to the pipe trade. No. 785-BE power operated bender, 1-¼ in. to 5 in. capacity, and No. 798 electric power pump will be featured.

GRINNELL CO., INC., 260 W. Exchange St., Providence 1, R. I.—Booth 305

In attendance: A. F. Van Eck, D. A. Johnson, and others.

Exhibiting: Pipe fittings; pipe hangers; spring hangers; constant supports; welding fittings; diaphragm valves; unit heaters; prefabricated piping; automatic sprinklers. Textile unit heater, especially designed for use in textile mills, etc., will be featured.

GUSTIN-BACON MFG. CO., 210 W. 10th St., Kansas City, Mo.—Booth 543

In attendance: H. O. Sheidley, H. M. Grant, G. C. Jordan, F. H. Ebbert, M. F. Hauserman, Jr., E. N. Sleight, B. P. Murphy.

Exhibiting: "Ultralite" and "Ultrafine" glass fiber insulations for heating, ventilating and air conditioning ducts and appliances. Several new products will be featured.

HARRIS & CO., ARTHUR, 212 N. Aberdeen St., Chicago 7, Ill.—Booth 1026

In attendance: George C. Harris, Arthur H. Elliott.

Exhibiting: Copper, stainless steel, steel, and aluminum floats.

HART & COOLEY MFG. CO., 500 E. 8th St., Holland, Mich.—Booth 1025

In attendance: George D. Heeringa, E. J. Rowder, John H. VanDyke, Fred H. Heads, Robert J. Kubat, Richard Smeenge, George Braun.

Exhibiting: Registers, grilles and diffusers for warm air heating and air conditioning. Floor and sidewall diffusers for perimeter heating installations will be featured.

HASTINGS INSTRUMENT CO., INC., Hampton, Va.—Booth 1342

In attendance: Raymond T. Doyle, John L. Wright.

Exhibiting: Standard "Air-Meter", precision "Air-Meter", electronic manometer flowmeter, vacuum gage. Exhibit will show graphically how air velocity measurement can promote efficient, money-saving installation of heating and ventilating systems and will demonstrate the ability of "Air-meters" to measure air velocities as low as 5 fpm.

HEATING, PIPING & AIR CONDITIONING, 6 N. Michigan Ave., Chicago 2, Ill.—Booth 425

In attendance: Frank P. Keeney, Charles E. Price, Wallace J. Osborn, Robert A. Jack, C. M. Burnam, Jr., George C. Cutler, James D. Thomas, Thomas V. Johnson, Robert J. Osborn, Frank S. Easter, James E. Sacra, David V. Mahan.

Exhibiting: Heating, Piping & Air Conditioning magazine; market information.

HEATING & VENTILATING, 148 Lafayette St., New York 13, N. Y.—Booths 537-539

Exhibiting: Publication

HEAT-TIMER CORP., 520 Broadway, New York 12, N. Y.—Booth 439

In attendance: Harry Zeitlin, Edward J. Zeitlin, Lee Leighton.

Exhibiting: Electronic weather actuated control; thermostatic air valves; quick vent air valve; smoke eye. New electronic weather actuated control, "Thermo-Air" valves, quick-vent "Vari-valves", and smoke eyes will be featured.

HEIL CO., 3000 W. Montana St., Milwaukee 1, Wis.—Booths 1246, 1347, 1348

In attendance: George Hochstein, Roy King, Don Fricker, Karll Mould, Wm. Schumacher, J. F. Heil, Sr., John Barclay, Jack Huber, Herbert Erdman, J. F. Heil, Jr., Fred Brubaker, Fred Zwanzig, K. F. Johnson.

Exhibiting: Oil and gas fired winter air conditioners, steam and hot water boilers, and conversion burners. The oil and gas fired furnaces and boilers will be featured.

HENRIKSEN CO., C. O., 2300 S. Avers Ave., Chicago 23, Ill.—Booth 937

In attendance: C. O. Henriksen, H. W. Henriksen, G. B. Henriksen, C. O. Ricketts, C. E. Evilsizer.

Exhibiting: Miniature firebrick models of combustion chambers; photographs of boiler settings and furnace installations.

HENRY FURNACE CO., Medina, Ohio—Booth 406

In attendance: J. Crombie, C. L. Travers, W. H. Olsen, R. H. Olsen.

Exhibiting: Horizontal furnaces, gas and oil fired; gas fired unit heaters; cooling equipment; gas and oil conversion burners; counterflow, "Hi-boy" and basement type winter air conditioning equipment, gas and oil fired; gravity furnaces, gas and oil fired. Horizontal furnaces, gas fired unit heaters; gas conversion burners, and cooling equipment will be featured, and there will be a "live" demonstration of a loop type perimeter system using a counterflow winter air conditioning unit.

HERSHEY MACHINE & FOUNDRY CO.—see MOTORSTOKER DIV.

HOFFMAN SPECIALTY MFG. CORP., 1001 York St., Indianapolis 7, Ind.—Booth 2-218

In attendance: N. D. Skinner, R. J. McCracken, A. O. Roche, Jr., R. G. James, W. W. Dillon.

Exhibiting: Complete line of heating specialties for steam and water; "Webster Tallmadge" zone controls. Universal vent for water or steam, hot water vent, and new line of vacuum and condensation pumps will be featured.

HOOK & ACKERMAN, INC., 9 E. 40th St., New York 16, N. Y.—Booths 1208, 1210

In attendance: W. F. Hosmer, J. F. Baier, H. S. Ackerman, W. W. Metsch.

Exhibiting: "Hydrotherm" gas fired boiler for hot water systems.

HOOVER CO., KINGSTON-CONLEY DIV., 68 Brook Ave., North Plainfield, N. J.—Booth 2-109

In attendance: R. A. Potter, J. C. Hoover, R. L. Bratt, B. G. Roskopp, R. F. Carey, C. P. Williams, W. A. Pizzini, R. E. Swin, A. E. Ott.

Exhibiting: Fractional and integral horsepower electric motors.

HOUSE & CO., T. S., 355 S. Kensington Rd., Cleveland 16, Ohio—Booth 2-804

In attendance: T. S. House, R. L. Linquist, J. C. Zancker, F. V. Kassell, Jack Harrison.

Exhibiting: "Wilder" slitting shears and "Bett-Marr" sheet metal band saws. The power driven shear will perform the functions of a 10 ft squaring shear, and the sheet metal band saw is of interest to every shop making its own warm air fittings.

IDEN ASSOCIATES, 1809 Milwaukee Ave., Chicago 47, Ill.—Booth 2-812

In attendance: James Bateman, Ray J. Iden.

Exhibiting: "Ventfab" and "Ventglas" fabrics for flexible connections in ventilating and air conditioning systems.

ILG ELECTRIC VENTILATING CO., 2850 N. Crawford Ave., Chicago 41, Ill.—Booth 1042

In attendance: B. E. Casey, A. C. DeSmet, J. P. Hertz, W. H. Hallsteen, C. W. Dexter, P. A. Charter.

Exhibiting: Direct-connected centrifugal fans; tube axial fans; power roof ventilators; window fans; unit heaters; direct-connected propeller fans.

ILLINOIS ENGINEERING CO., Racine Ave. & 21st St., Chicago 8, Ill.—Booth 1142

In attendance: Robert L. Gifford, James C. Matchett, Gordon L. Harris, J. L. Ehretsman, R. W. Leutwiler, Paul B. Hultgren, L. Bandet, A. F. Nesbet, W. A. Loehrl, A. Marshall, G. Snagel, K. Johnson, L. Moore.

Exhibiting: Glass model of steam trap operating under steam; recording instrument performance of float and thermostatic trap draining a unit heater under steam; complete control panels and cabinets for standard and high vacuum steam heating control systems; general line of heating specialties for standard vacuum, high vacuum and vapor heating systems. Latest developments in automatic steam and fluid control equipment will be featured.

ILLINOIS IRON & BOLT CO.—see FREEMAN STOKER DIV.

ILLINOIS TESTING LABORATORIES, INC., 420 N. LaSalle St., Chicago 10, Ill.—Booths 1032, 1034

In attendance: M. D. Rauscher, Monroe D. Carlson, Charles O. Wilson.

Exhibiting: Pyrometers; "Velometers;" dew pointers; thermo-anemometers; controllers, resistance thermometers.

IMPERIAL BRASS MFG. CO., 1200 W. Harrison St., Chicago 7, Ill.—Booth 225

In attendance: C. H. Benson, F. McNellis, Jr., A. E. Hallstrom, R. Cherney, Harold McNellis, E. F. Todd, G. Franck.

Exhibiting: Flared, compression, "Hi-Duty", "Kwik-Tite" and brass pipe fittings; tube fittings for LP gas, refrigeration flared tube fittings, refrigeration valves, refrigeration driers; shut-off valves; tubing tools; soldering equipment. New equipment to be featured includes No. 500-F "Rol-Air" flaring tool, which both flares and burnishes tubing; No. 270-F gear-type tube bender, which bends all kinds of tubing including hard temper copper; improved "DiaSeal" refrigeration valves; No. 350-F full-range heavy duty tube bender; No. 362-FA 2-in-1 benders; No. 206-F slide to size tube cutter for large sizes of tubing.

INDEPENDENT REGISTER CO., 3747 E. 93rd St., Cleveland 5, Ohio—Booth 124

In attendance: K. B. Solberg, B. N. Richardson.

Exhibiting: Registers and grilles for heating, air conditioning and ventilating. Registers and grilles for perimeter heating installations will be featured.

INGERSOLL-RAND CO., 11 Broadway, New York 4, N. Y.—Booth 2-300

In attendance: R. E. Allen, W. W. Cramer, D. N. Douglas, E. L. Raming, Jr., C. W. Gray, J. L. Carpenter, H. D. Ford, H. W. Newsome, R. J. Dodge, H. L. Gay, J. W. French, O. E. Schneider, C. M. Wilkins, Jr.

Exhibiting: Centrifugal pumps and air compressors particularly adapted to heating, ventilating and air conditioning. One pump will be operated and circulating liquid through a model of a tryical air conditioning system with variable conditions of operation. "KRVS" line of small centrifugal motor-pumps with mechanical seals will be featured. The line has recently been extended in coverage. A new line of horizontally-split, single-stage, double-suction pumps with mechanical seals; and non-lubricated air compressors for oil-free instrument control air supply will be featured.

INSULATING CONCRETE CORP.—see ZONOLITE CO.

INTERNATIONAL HEATER CO., 101 Park Ave., Utica 2, N. Y.—Booth 443

In attendance: Jack Bennett, James D. Bond, Charles Bremer, William Hutchinson, Frank Mehrings, Clyde Moyer, Jr., Clyde Moyer, Sr., Irving C. Barber, John J. Hildebidle, N. R. Foloky, Millar Wheeler, Elwood Hesch.

Exhibiting: Gas and oil "Hi-Boys"; "Lo-Boys", gravities; counterflows, oil burning boiler. New assembled gas and oil "Hi-Boys" and "Lo-Boys" will be featured.

INTERNATIONAL MFG. CO., 600 E. Grand, Oklahoma City, Okla.—Booth 529

IRON CITY CHEMICAL CO.—see GLYCOLATOR DIV.

IRON FIREMAN MFG. CO., 3170 W. 106th St., Cleveland 11, Ohio—Booths 1232, 1234, 1236, 1238

In attendance: C. T. Burg, W. J. O'Neil, E. C. Webb, Dale Wylie, George Armour, E. W. Jones, J. C. Veltman.

Exhibiting: Residential oil, gas and coal burners, boilers and furnaces; commercial-industrial gas burners and oil burners; and stokers, and combination units for dual and triple fuel firing; residential gas winter air conditioner furnaces, highboy and lowboy models, and Kewanee-Iron Fireman oil-gas boiler-burner unit will be featured.

JACKSON & CHURCH CO., 321 N. Hamilton St., Saginaw, Mich.—Booths 134, 136, 138, 2-802

In attendance: C. W. Stuart, D. L. Perrot, L. S. Redford, F. C. Adams, Stan Richards, Frank E. Young, Jr., Herbert F. Robinson, Samuel S. Neide, Arthur W. Pracker, Paul R. Deuble, W. H. Tonner, J. B. Winston, Arthur E. Duwe, Richard J. Hoover, R. F. Goughnour, Ray P. Jones.

Exhibiting: Oil and gas fired suspended furnaces, oil and gas fired floor furnaces. New type oil burners on suspension equipment, new "Stule" heat exchanger for suspended and basement models, and larger gas suspended furnaces will be featured.

JACUZZI BROS. INC., 4100 Bayless Ave., St. Louis 23, Mo.—Booth 2-526

In attendance: Robert W. Hawkins, J. Walter Glock, Dante Jacuzzi.

Exhibiting: Air conditioning pumps and circulators; heating pumps and circulators. New "Series A" pumps and circulators for heating and air conditioning industries will be featured.

JEFFERSON ELECTRIC CO., 25th & Madison, Bellwood, Ill.—Booth 2-312

In attendance: C. T. Harnett.

Exhibiting: Oil burner ignition transformer.

JENKINS BROS., 100 Park Ave., New York 17, N. Y.—Booth 243

Exhibiting: Valves.

JENN AIR PRODUCTS CO., 333 N. Pennsylvania St., Indianapolis 4, Ind.—Booth 1010

In attendance: C. V. Patterson, Edw. Filkins, Edw. Neiderhofer, L. J. Jenn.

Exhibiting: New and improved wall and roof exhaust equipment.

JOHNSON CO., S. T., 401 N. Broad St., Philadelphia 8, Pa., 940 Arlington Ave., Oakland 8, Calif.—Booth 2-402

In attendance: D. F. Johnson; Robert P. Johnston, W. S. Harlacher, W. Thoms, W. E. Lees, A. V. Leudemann.

Exhibiting: Commercial, industrial and residential type oil and combination oil and gas burners; boiler burner units; furnace burner units; water heaters: and high pressure boilers. Recently acquired "MKO" division will show high pressure boilers up to 30 hp — gas, oil or combination oil and gas fired.

JOHNSON SERVICE CO., 507 E. Michigan St., Milwaukee 2, Wis.—Booths 1007, 1009. 1011, 1013, 1015

In attendance: M. M. Herrick, J. J. Philippi, C. A. Storch, H. H. Korff, C. K. Henriksen, Henry Seetch, J. C. Barr, M. E. Coobs, I. G. Doptis, O. A. Star, Jr., G. E. Bendix, L. C. Carlsen, A. J. Hunter.

Exhibiting: Automatic temperature and air conditioning control systems, with the instruments and controllers in actual operation. New model of electronic "duo-Stat", a weather-compensated heat regulator; new "Record-O-Stat" recorder-controller; and an expanded line of small control valves for convectors and unit air conditioners will be featured.

JOY MFG. CO., Henry W. Oliver Bldg., Pittsburgh 22, Pa.—Booths 1111, 1113, 1115, 1117

In attendance: R. A. Heindel, C. L. Tinker, H. A. Devlin, C. R. Browning, C. R. Hiers, A. T. Bloxham, J. P. Gardner.

Exhibiting: Direct drive, belt drive and controllable pitch, "Series 1000" fans for industrial and commercial applications; aircraft fans; electronic equipment cooling fans; general purpose plastic fans. Three large units representative of all types of "Series 1000" fans will be exhibited for the first time, and several representative new models of aircraft and electronic equipment cooling fans will be shown.

KAUSTINE CO. INC., Perry, N. Y.—Booths 316, 320

In attendance: J. B. Mollnow, Sr., J. B. Mollnow, Jr. W. F. Stahl, R. E. Preine.

Exhibiting: Oil fired warm air furnaces.

KEENEY PUBLISHING CO., 6 N. Michigan Ave., Chicago 2, Ill.—Booth 425

In attendance: Frank P. Keeney, Chas. E. Price, Wallace J. Osborn, Robert A. Jack, C. M. Burnam, Jr., George C. Cutler, James D. Thomas, Clyde M. Barnes, Thomas V. Johnson, Robert J. Osborn, Frank S. Easter, James E. Sacra, David V. Mahan.

Exhibiting: Heating, Piping & Air Conditioning magazine; American Artisan magazine; market information.

KENNARD CORP., 1819 S. Hanley Rd., St. Louis 17, Mo.—Booths 224, 226, 228

In attendance: Sam M. Kennard, III, Ben M. McDougall, W. Boardman Jones, F. G. Bietsch, F. W. McKenna, E. John Hill, C. Z. Adams, A. E. Randklev, Arnold Croohe, John J. Barry, Ray Bauer, R. J. Clark, Wm. H. Dudley, John R. Ellstrom, James F. Hoey, R. F. Sullivan, Floyd Baird, Richard Kitch, Gordon Ervin, David S. Falk, Robert I. Fruth, Ted Jasuta, Olan J. Hill, Duane A. Krohn, O. K. McCullough, Ben Paller, Doug Palmer, Sax Lawrence, Z. M. Prane, Fred Rodgers, Gary G. Schultz, L. E. Slawson, R. H. Spangler, J. Fuller Stafford, C. L. Bensen, Vernon Tupper, Carl J. Vespasian, Elwood C. Giberson.

Exhibiting: Multi-zone air conditioning units; heating and ventilating units; air conditioning coils for cooling and heating; cooling towers. Small cooling towers suitable for residential air conditioning application will be featured.

KENT CO., INC., 107 Canal St., Rome, N. Y.—Booth 535

In attendance: C. E. Clifford, and others.

Exhibiting: Double suction furnace and boiler cleaner. Used in conjunction with the auxiliary dirt tank for added capacity it is available for furnace cleaning jobs which require a capacity over and beyond what is required for domestic heating plants.

KEWANEE-ROSS CORP., Kewanee, Ill.—Booth 715

KINGSTON-CONLEY DIV.—see HOOVER CO.

KLEER-KLEEN MFG. CO., 901 72nd Ave., Oakland 21, Calif.—Booth 2-615

In attendance: R. D. Fish, C. S. Laumeister; Early E. Sanders, Jr.

Exhibiting: Floor and wall oil burning furnaces. "Channel Flame" vaporizing conversion oil burner with electric ignition will be featured.

KORFUND CO. INC., 48-15 32nd Pl., Long Island City 1, N. Y.—Booth 943

In attendance: Donald H. Vance, Norman Creash, Alex Budai, George Zintel, Lou Fahning, George Hoffman, Kirby Quinn, Ed. Gifford, A. R. Martin.

Exhibiting: Duplex twin rail fan and motor base; steel spring "Vibro" isolators; "Elasto Rib"; rubber mountings, cork products. Models of equipment and photographs showing typical application of products to industry will be featured.

KRITZER RADIANT COILS, INC., 2901 Lawrence Ave., Chicago 25, Ill.—Booth 343

In attendance: H. E. Kritzer, C. G. Newton, C. C. Schedler, H. E. Kritzer, Jr., M. A. Lucchese, R. E. Fennema.

Exhibiting: Commercial fin pipe coils and covers; baseboard coils and enclosures; radiant fin tube coils. New design features embracing all models of the line will be shown.

LAHARCO INDUSTRIES, 721 2nd Ave. N., Minneapolis 5, Minn.—Booth 129

In attendance: W. R. Anderson, H. E. Latourell.

Exhibiting: Gas conversion burners.

LAKE CHEMICAL CO., 3052 Carroll Ave., Chicago 12, Ill.—Booths 2-714, 2-716

In attendance: Dr. L. Aronberg, B. Lytton, A. H. Cahn, Martin Stanford, C. Kleiman, Lou Trisler, C. H. Sudakoff, Wm. J. McSherry.

Exhibiting: "Pipetite-Stik" pipe joint compound in stick form; "Krak-Stik" sealing cement and caulking compound in stick form. "Olyltite-Stik" cement for sealing leaky oil tanks, etc. and "La-Co" non-acid, self-cleaning flux in stick form will be featured.

LAU BLOWER CO., 2001 Home Ave., Dayton 7, Ohio—Booths 211, 213, 215

In attendance: H. W. Faulkender, T. I. Byrd, J. Burrowes, W. Wentling, E. Sullivan, Ernie Wolford, Ed Humphrey, Jim Wallace, Charles Miley, Charles Sigman, Bill Lohrey, Lee Gillespie, Gene Brown, Don Jensen, G. R. Mergenthaler.

Exhibiting: Blower assemblies; direct drive blowers; weld wheels; hot dip galvanized wheels; hot dip galvanized blower assemblies; "Gold Seal" bearings; "Lausteel" pulleys, CS and VS; package units; "Porta-Breez"; "Tilta-Breez"; new motor mounting; new direct drive blower; and "Gold Seal" bearings will be featured.

LIMA REGISTER CO., 651 N. Baxter St., Lima, Ohio—Booth 521

In attendance: Henry R. Pataky, C. J. LeMaster, R. B. Morey, Ray Boland, John T. Thornton.

Exhibiting: Registers and grilles for warm air heating and air conditioning. New wall diffuser for perimeter and small pipe installations will be featured.

LIPMAN REFRIGERATION DIV., YATES-AMERICAN MACHINE CO., 126 E. Shirland, S. Beloit, Ill.—Booth 931

In attendance: F. H. Kibler, J. J. Gallagher, Ray Collins, H. L. Hayhurst.

Exhibiting: Convertible type packaged air conditioner (2, 3, 5 and 7½ tons); window unit (½ and ¾ ton). The convertible type unit is a new feature in that it can be readily converted from a residence unit to a commercial unit.

LIQUIDEPTH INDICATORS, INC., 43-22 10th St., Long Island City 1, N. Y.—Booth 1147

In attendance: Dan Bierman, Arthur Bierman, Norbert M. Milair, James J. Wargas, Joseph A. Jawett.

Exhibiting: Liquid depth indicating equipment.

LOCKFORMER CO., 4615 W. Roosevelt Rd., Chicago 50, Ill.—Booth 417

In attendance: George W. Lamberson, Harold G. Flagler, John Davis, Edward C. Bill.

Exhibiting: "Lockformer"; "Cleatformer"; "Easy Edger"; and "Lockformer" slitting attachment. Power takeoff from the "Lockformer", making a compact and practical unit for large and small shops alike, will be featured, and a brand new development will be displayed for the first time.

MAGNAFLOW PUMP CORP., 45 Astor Pl., New York, N. Y.—Booth 2-608

MAGNETROL, INC., 2110 S. Marshall Blvd., Chicago 23, Ill.—Booth 2-528

In attendance: Lester E. Stybr, B. L. Binford, James Vonesh.

Exhibiting: Boiler water level controls, including low level cutoffs, feed pump control and low level cutoffs, and combination water columns and boiler water level controls, tank float switches — top mounting, side mounting (with float in tank), and external float cage units; displacement type controls for tank and sump applications; refrigeration control; flow switch; high and low level alarms. Operating model of tandem unit for pump control and alarm service, and combination water column and boiler control in simulated boiler service, will be featured.

MAID-O'-MIST, INC., 3217 N. Pulaski Rd., Chicago 41, Ill.—Booth 1017

In attendance: Wm. G. Mussun, E. E. Berthet, Geo. C. Hench, James McEntee, Joe O'Connor, E. J. Busch, E. H. Price, H. J. Carr, O. V. Woolley, James A. Madden, Herbert Waterstraat, Paul Thompson.

Exhibiting: Automatic air valves for hot water heating systems; automatic humidifiers for all types of heating; water line float control valves; balancing valve adapter units; heating specialties.

MARIETTA METAL PRODUCTS CORP., 540 N. 63rd St., Philadelphia, Pa.—Booths 2-413, 2-415

MARLEY CO., 222 W. Gregory Blvd., Kansas City 13, Mo.—Booth 1043

In attendance: L. T. Mart, L. A. Christensen, J. A. Cameron, F. B. Reed, W. G. Cramer, R. W. Maze, R. L. McFadin, O. E. Bloebaum, E. T. Gessell, W. W. Starke.

Exhibiting: Double-flow "Aquatower"; "Aquatower"; natural draft tower. Cut-away structure of a 50 ton double-flow "Aquatower" will be featured.

MARLO COIL CO., 6135 Manchester, St. Louis 10, Mo.—Booths 1001, 1002, 1101

In attendance: H. R. Iverson, K. W. Wickes, A. G. Allen, Jim Chapman, Bert E. Martin, Walter B. Moses, Jr., Walter W. Murphy, George F. Flinn, Guy Hairston, Norman Weinstein, Louis Davidson, Ralph Strutzel, J. T. Hultgren, R. K. Hunter, Howard Caton, Ralph Pat Kelley, John J. Kramer, E. H. Lambert, George M. Seebree, S. S. Webb, F. G. Meyers, L. C. Pellegrini, F. Ed. Ince, A. T. Marlo, C. D. Marlo, H. Kain.

Exhibiting: Evaporative condensers; cooling towers; multi-zone units; remote type room conditioners, ceiling and floor type; ceiling and floor type air conditioning units; blast coils for heating and cooling. A new line of heating and ventilating units for ceiling or floor mounting, designed specifically for heating installations only, will be featured.

MARSH HEATING EQUIPMENT CO., 3501 Howard St., Skokie, Ill.—Booths 1130, 1132

In attendance: James Emmett, Jr., Wm. Ensign, R. E. Barnett, Charles Kelly, S. C. Kauffman.

Exhibiting: Complete line of heating specialties, including radiator valves, radiator traps, steam traps, bucket traps, vents and also a representative number of gages, thermometers, water regulating valves, solenoid valves, and needle valves. Complete new line of needle valves, also new "Serviceman" testing thermometers, will be featured.

McCORD CORP., 2587 E. Grand Blvd., Detroit 11, Mich.—Booth 2-338

McDONNELL & MILLER, INC., 3500 N. Spaulding Ave., Chicago 18, Ill.—Booths 936, 942

In attendance: E. N. McDonnell, Nils W. Swanson, George La Roi, John James, Wm. Gleason, Leo Kmiecik, Richard Flickinger, J. W. Ramsay, Howard Peary, Richard Berry, Jerry Flaherty, James Platt, Gene Mitchell, George Kelly.

Exhibiting: Full line of safety devices, including boiler water feeders, low water fuel cutoffs, pump controllers; temperature relief valves, pressure relief valves, combinations of temperature and pressure relief valves, float switches, float valves, explosionproof controllers, humidifier water level controls, and related products. New improved line of temperature relief valves and combinations of temperature and pressure relief valves for hot water systems will be exhibited for the first time.

McQUAY, INC., 1600 Broadway St., N. E., Minneapolis 13, Minn.—Booths 309, 311, 313

In attendance: H. B. Thomas, K. R. Lundberg, F. F. Altman, W. H. Markson, D. R. Wallin, A. R. Flynn, H. B. Williams.

Exhibiting: Heating and ventilating unit; air conditioning unit; heating and cooling coils, multi-zone air conditioner; remote room air conditioners; special application ⅜ in. tube coils. Five types of remote-room air conditioners, newly designed line of heating and ventilating and air conditioning units, and ⅜ in. tube coils designed primarily for manufacturers of self-contained room air conditioners will be featured.

MERCOID CORP., 4201 W. Belmont Ave., Chicago 41, Ill.—Booths 116, 120

In attendance: Hugh Courteol, J. W. Owens, R. Fenton Fisher, W. L. Colterjohn, W. K. Stauffer, J. F. McCauley, J. A. Johnson, Wm. Ufer, W. E. Jones, W. L. Lischett, I. E. McCabe, V. S. Krale.

Exhibiting: Complete line of mercury switch equipped automatic controls for heating, ventilating, refrigeration, air conditioning and industrial applications.

METALS & CONTROLS CORP. — see SPENCER THERMOSTAT CO. DIV.

METROMATIC MFG. CO., 21 Henderson St., Everett 49, Mass.—Booths 1316, 1318, 1320

MID-CONTINENT METAL PRODUCTS CO., 1960 N. Clybourn Ave., Chicago 14, Ill.—Booth 1224

In attendance: A. F. Zitzewitz, E. J. Haedike, C. F. Petersen, E. W. Haedike.

Exhibiting: Power type gas burners for residential, commercial and industrial boilers and furnaces; operating exhibits of both the "Economite" residential and "Lo-Blast" large type models will be demonstrated. New No. 500 "Economite", with a maximum capacity of 500,000 Btu input will be shown.

MILWAUKEE ELECTRIC TOOL CORP., 5316 W. State St., Milwaukee 8, Wis.—Booths 2-814, 2-816

In attendance: Curtis Meyer, R. L. Siebert, Larry Morand.

Exhibiting: "Sawzall"; plumbers' and electricians' right angle drive kit; drills, electric hammers, circular saws.

MILWAUKEE GAS SPECIALTY CO., 730 N. Jackson St., Milwaukee 1, Wis.—Booth 1021

In attendance: P. S. Brant, J. A. Wolff, V. C. Kitzrow, J. H. Thornbery, E. O. Abel, S. L. Kile, D. R. Weidenfeller; W. F. Hoeser.

Exhibiting: "Baso" valves and pilot burners, and featuring new "Actrol" valves.

MINNEAPOLIS-HONEYWELL REGULATOR CO., 2753 4th Ave., S., Minneapolis 8, Minn. —Booths 1046, 1047

In attendance: T. McDonald, J. E. Haines, J. S. Locke, V. D. Wissmiller, R. W. Crysler, E. F. Snyder, R. L. Allen, C. W. Proctor, L. B. Belford, H. R. Canoyer, J. F. Cummiskey, K. L. Wilson, K. W. Schick, L. C. McRoberts, R. M. Locke, T. A. Reed, H. C. Carlsen, Jr., C. C. Cochran, D. J. Peterson, H. D. Bissell, J. A. Young, E. E. Fox, J. B. Daniels, W. Burton.

Exhibiting: Pneumatic, electric and electronic control equipment for heating, ventilating and air conditioning. Of special interest are automatic rate reset for pneumatic systems; electronic humidity control; electronic velocity control; new electronic system combining amplifier and motor in one small unit; complete line of fast acting aquastats; new line of diaphragm gas valves; improved electronic combustion control equipment; electronic "Moduflow" control system.

MITCHELL MFG. CO., 2525 Clybourn Ave., Chicago 14, Ill.—Booths 329, 331, 333

In attendance: Bernard A. Mitchell, E. A. Tracey, Leonard H. Solomon, Howard G. Haas, C. J. Schroeder, Armand Zucker, J. K. Neuhauser.

Exhibiting: Room air conditioners and dehumidifiers (capacities 1/3, ½, ¾ and 1 hp room air conditioners, ⅛ hp dehumidifiers). Room air conditioners with "Weath'r-Dial" which not only cool but heat as well will be featured.

MONARCH MFG. WORKS, INC., 2501 E. Ontario St., Philadelphia 34, Pa.—Booth 1146

In attendance: E. B. Frame, J. M. Carroll, J. C. Underwood, W. M. Fink, C. E. Fink.

Exhibiting: Oil burner nozzles; air mixing equipment, including combustion heads, regulating valves, strainers and water sprays.

MORRISON PRODUCTS, INC., 16816 Waterloo Rd., Cleveland 10, Ohio—Booth 1217

In attendance: Hunter Morrison, Hunter Morrison, Jr., Thompson Morrison, Al. Galava.

Exhibiting: Blower wheels and blowers. Direct drive blower, self-aligning, rubber mounted bearing, will be featured.

MORRISON STEEL PRODUCTS, INC., 601 Amherst St., Buffalo 7, N. Y.—Booth 205

In attendance: Jack Kohnstamm, John K. Farrar, Walter E. Duffy, Samuel Niede, Dave Grant, Clayton Stahlka.

Exhibiting: Complete line of "Mor-Sun" forced warm air furnaces for gas or oil, each model of which can be fitted with a gas or oil burner.

MORSE-SMITH-MORSE CO., 165 Dexter Ave., Watertown 72, Mass.—Booth 2-315

In attendance: John C. Dieselman, Robert P. Johnston.

Exhibiting: "Firomatic" fusible safety valves and other oil burner accessories.

MOTORSTOKOR DIV., HERSHEY MACHINE & FOUNDRY CO., 153 Cherry St., Manheim, Pa.—Booths 1309, 1311, 1313, 1315, 1317, 1321

In attendance: John D. Wentz, R. F. Loomis, H. B. Menard, John Sheridan.

Exhibiting: Anthracite boiler burner unit; anthracite forced warm air unit; conversion anthracite burners. Crossfeed commercial anthracite burner will be featured.

MUELLER FURNACE CO., L. J., 2005 W. Oklahoma Ave., Milwaukee 15, Wis.—Booths 1237, 1239, 1243

In attendance: H. P. Mueller, F. J. Nunlist, H. P. Mueller, Jr., J. H. Reock, O. J. Ress, N. E. Hill, R. W. Weekes, D. J. Spahr, H. B. McKee, G. A. McDonough.

Exhibiting: "Climatrol" heating, cooling and air conditioning equipment. Incinerator, cooling equipment, and winter air conditioners and boilers will be featured.

MULTI-VENT DIV.—see PYLE-NATIONAL CO.

MYSTIK ADHESIVE PRODUCTS, 2635 N. Kildare Ave., Chicago 39, Ill.—Booth 437

In attendance: William A. Givens, Stanley L. Ostrenga, William J. Miller, James C. Gallagher, John B. Pursley, Jesse E. Lehman, Jr., Russell J. Leander, John K. Leander, Tom W. Leo.

Exhibiting: "Self-Stik Dri-Pipe" hot and cold pipe insulation; cloth and paper tapes.

NAPANEE IRON WORKS, LTD., Ann St., Napanee, Ontario—Booth 2-141

In attendance: W. W. Palm, M. S. Clark, J. R. Matthews.

Exhibiting: Packaged type boilers.

NASH ENGINEERING CO., Wilson Ave., South Norwalk, Conn.—Booth 642

In attendance: I. C. Jennings, E. A. Mead, H. E. Adams, G. B. Wright, J. B. Wright.

Exhibiting: Return line vacuum heating pumps; condensation pumps. A new line of return line vacuum heating pumps providing "high standards of performance, efficiency, and adaptability," will be featured. This line, the type CSM, is offered in a full range of sizes through 100,000 sq ft EDR for operating vacuums up to 20 in. and for discharge pressures from 10 to 70 lb.

NATIONAL RADIATOR CO., 221 Central Ave., Johnstown, Pa.—Booths 302, 401

In attendance: C. M. Baumgardner, J. W. LeRoy, C. J. Philage, R. S. Doherty, Russell Doherty, G. S. Ham, F. D. Thomas, W. D. Braden, L. A. Smith, C. R. Guenther, R. L. Standaert, E. Edelblut, S. Sackol, J. W. Hall, H. W. Williams.

Exhibiting: Cast iron and steel boilers for all fuels; gas boilers; gas unit heaters; hot water and steam unit heaters; non-ferrous baseboard; cast iron and non-ferrous convectors; ferrus fintube convectors; radiators; heating accessories. Gas fired unit heater with steel heating element; "National Packet" all-in-one automatic heating unit and domestic water supply, oil and gas fired; and "National Art" baseboard will be featured.

NELSON PRODUCTS, HERMAN; AMERICAN AIR FILTER CO., INC., 215 Central Ave., Louisville 8, Ky.—Booths 735, 737

In attendance: Richard H. Nelson, Robert W. Nelson, Charles S. Stock, Arthur Hubbard, Richard M. Burbank, Frank Carroll, William Potter, Robert DeLay, Sam Wilson, Harold Meyer, Les Linehan, Hugh Mullaney, J. C. Donaldson, Norman Peterson, Richard Rhodes.

Exhibiting: "Draft-Stop" unit ventilators; propeller fans; propeller fan type unit heaters; "DeLuxe" unit heaters; unit blowers; centrifugal fans. New centrifugal fan design will be featured.

NESBITT, INC., JOHN J., State Rd. & Rhawn St., Philadelphia, Pa.—Booth 2-329

In attendance: J. W. McElgin, H. B. Hedges, W. D. Widerman, K. W. Will, G. S. Rohrer.

Exhibiting: "Sill-Line" radiation and radiation with storage cabinets; heating and cooling coils; baseboard radiation; gas fired unit heaters; "Syncretizer" unit ventilators. The radiation and the gas fired unit heaters are new products, and the radiation with storage cabinets is a new application.

NEW YORK BLOWER CO., 32nd St. & Shields Ave., Chicago 16, Ill.—Booths 1125, 1127

NIAGARA BLOWER CO., 405 Lexington Ave., New York 17, N. Y.—Booth 635

NIAGARA FURNACE DIV., FOREST CITY FOUNDRIES CO., 2500 W. 27th St., Cleveland 13, Ohio—Booths 107, 109

In attendance: W. C. Kremser, I. E. Seith, R. H. Leisenheimer.

Exhibiting: Warm air furnaces for gas and oil. New "Hiboy" and downflow models for closet installation will be featured.

NIAGARA MACHINE & TOOL WORKS, 637 Northland Ave., Buffalo 11, N. Y.—Booths 1110, 1112, 1114

In attendance: L. L. Hock, F. L. Kelsey, R. E. Harwood, W. M. Evarts.

Exhibiting: Air actuated squaring shears; electrically driven squaring shears; foot operated squaring shears; air actuated bar folder; multi-drive power table for rotary operations; high speed circle shear; universal rotary machine rigged for flanging; electrically driven slip roll former hand tools. The air actuated squaring shear and the air actuated bar folder will be featured.

NORGE HEAT DIV., BORG-WARNER CORP., 346 E. South St., Kalamazoo, Mich.—Booths 1031, 1033, 1035, 1037, 1039

In attendance: G. L. Brown, E. J. Effinger, J. M. McNamara, H. F. Oakes, R. E. Rawles, L. J. Studnicky, W. C. Walter, W. B. Johnson, J. W. Pulkinghorn, W. F. Krueger, L. L. Groff, C. S. Davis, Jr.

Exhibiting: Oil and gas-fired equipment. F610 series oil-fired furnaces and COB53 conversion oil burners will be featured.

NORMAN PRODUCTS CO., 1150 Chesapeake Ave., Columbus 12, Ohio—Booths 306, 405

In attendance: D. D. Piper, E. A. Norman, R. G. Dawley, D. A. Ruen, G. P. Mandel, C. A. Reichelderfer.

Exhibiting: Complete line of heating equipment. Year 'round air conditioning, "Three Sixty" unit heater, redesigned and larger size horizontal furnaces, and complete line of upright furnaces will be featured.

NORSE BOILER CO., INC., Stelton Rd., New Market, N. J.—Booth 2-113

In attendance: Paul L. Olesen, W. C. Schwartz, Jack Klotz, Harry Woodruff, Edward E. Weingard, C. M. Wilcox, Jerry Parker, Frank McCusker.

Exhibiting: Vertical tube steel boilers; horizontal tube steel boilers; Scotch marine boilers; baseboard radiation.

NYE TOOL CO., 4120-30 Fullerton Ave., Chicago 39, Ill.—Booth 2-433

In attendance: A. P. Nye, F. L. McIntosh, Allon Erickson.

Exhibiting: Pipe tools. Special emphasis will be placed on continued operation in a power vise of fast operating 1 in. to 2 in. pipe threader using one set of high speed dies, and a power pipe cutter.

OLSEN MFG. CO., C. A., Elyria, Ohio—Booth 406

In attendance: C. A. Olsen, E. P. Hayes, M. H. Klett.

Exhibiting: Horizontal furnaces, gas and oil fired; gas fired unit heaters; cooling equipment; gas and oil conversion burners; counterflow, "Hi-boy" and basement type winter air conditioning equipment, gas and oil fired; gravity furnaces, gas and oil fired. Horizontal furnaces, gas fired unit heaters, gas conversion burners, and cooling equipment will be featured, and there will be a "live" demonstration of a loop type perimeter system using a counterflow winter air conditioning unit.

ORR & SEMBOWER, INC., Morgantown Rd., Reading, Pa.—Booths 2-100, 2-103

In attendance: R. C. Currie, L. A. Roethe, J. F. Keeler, W. B. Firman, S. D. Distelhorst.

Exhibiting: "Powermaster" packaged automatic boilers; "Voriflow" combination air atomizing oil and premixing bas burners.

OWENS-CORNING FIBERGLAS, Nicholas Bldg., Toledo 6, Ohio—Booths 235, 237, 239

In attendance: Wm. Stutts, W. Kuenn, H. Hogendobler, J. McCord, B. McCabe.

Exhibiting: "Dust-Stop" air filters; "Aerocor" insulation; duct insulations; industrial insulations. Feature will be kineoscope of Arthur Godfrey on TV selling filters, plus mechanical display showing "plus value" of "Fiberglas".

PACIFIC STEEL BOILER DIV., 300 Buhl Bldg., Detroit 26, Mich.—Booth 821

In attendance: H. B. Steggall, E. J. Grady, W. E. Everham, J. A. Callahan, H. Hathaway, H. Gulickson.

Exhibiting: Steel heating boilers.

PARAGON ELECTRIC CO., 1600 Twelfth St., Two Rivers, Wis.—Booths 2-417, 2-419

In attendance: Read W. Eldred, Warren A. Petersen, Harold E. Bond, Wm. C. Leff.

Exhibiting: Time switches.

PATCO MFG. CO., 231 N. Bread St., Philadelphia 6, Pa.—Booth 2-516

In attendance: Roy A. Fetterman, Paul J. Thompson.

Exhibiting: "Radiantair" baseboard.

PATTEN CO., J. V., Sycamore, Ill.—Booths 512, 514

In attendance: Don C. Patten, John H. Patten, A. B. Garman, C. A. Pearce, Wallace Landau, Harry Lloyd, S. R. Roberts, George Zingsheim, E. H. Lambert.

Exhibiting: "Sun Fuel-Master" automatic oil furnaces, forced air and gravity; automatic gas furnaces, forced air and gravity; summer air conditioning units, 2 ton and 3 ton. New 5000 series line of patented gas-oil furnaces incorporating new concept of automatic furnace design, and new self-contained 2 ton and 3 ton residential summer air conditioning units for installation in conjunction with "Sun" furnaces, using the same duct work for heating and cooling, will be featured.

PEERLESS ELECTRIC CO., West Market St., Warren, Ohio—Booth 2-333

In attendance: L. E. Schulein, A. C. Jacobson, E. T. Collins, C. E. Malone, W. B. Forrest, W. A. Curtis, Les Mills.

Exhibiting: Complete line of large and small exhaust fans, utility blowers, "Ventillatic" fans and furnace blowers.

PEERLESS PUMP DIV., 2005 N. Western Ave., Indianapolis, Ind.—Booth 2-437

In attendance: W. T. Harman.

Exhibiting: End suction pumps.

PENN BOILER & BURNER MFG. CORP., Lancaster, Pa.—Booth 2-514

PENN CONTROLS, INC., Goshen, Ind.—Booth 347

In attendance: A. W. Barr, K. W. Cash, R. V. Clark, J. E. Corbett, F. X. Fessler, J. Forbes, H. D. Gray, J. F. Kinney, A. Korte, R. H. Luscombe, E. B. Maire, J. G. Moravec, C. B. Morgan, R. L. Persons, C. P. Pestow, B. Ralph, R. Ratliff, A. L. Rubel, G. O. Sanders, H. C. Shilling, E. Tassin.

Exhibiting: Automatic controls for heating, ventilating and air conditioning. Type 925 gas valve; type 931 gas pressure regulator with vent limiting device; and dual mounted, low voltage heating and cooling thermostats will be featured.

PENNANT CORP., 200 Grant St., S.W. Grand Rapids, Mich.—Booth 1227

In attendance: L. Lobdell, L. F. Oberman, Meyer Weiner.

Exhibiting: Registers and grilles.

PENNSYLVANIA FURNACE & IRON CO., Warren, Pa.—Booths 912, 914

In attendance: R. L. Blodgett, C. S. Andersen, H. J. Harvey, Russ Strell, Reid Olson, B. A. Johnson.

Exhibiting: Gas fired gravity and winter air conditioning furnaces; gas fired water, steam and vapor boilers. New series 11 forced air furnace will be featured.

PERFECTION STOVE CO., 7609 Platt Ave., Cleveland 4, Ohio—Booth 903

In attendance: A. S. Bergschneider, G. A. Growner, H. W. Dean, H. C. Erikson, Harold Kiefer, W. C. Meredith, R. G. Meulenberg, W. M. Potter, T. W. Russell, J. W. Shrank, W. R. Wright.

Exhibiting: New oil burning and gas burning "Hi-Boy" and counterflow furnaces.

PERFEX CORP., 500 W. Oklahoma Ave., Milwaukee 7, Wis.—Booths 1212, 1214, 1216

In attendance: C. E. Lewis, Allen Butler, Maurice Eastin, Robert Engbring, Arthur Kornitz, Douglas DeVos, Harold Hatch, Ed Schmitt, Hugh Cameron, H. Dale Cook, Harold Wellnitz.

Exhibiting: Thermostats; oil burner primaries, limit controls; fan and limit controls; gas valves; stoker primaries, industrial instruments; appliance controls.

PETRO, 3170 W. 106th St., Cleveland 11, Ohio—Booths 1228, 1230

In attendance: J. R. Crews, C. T. Burg, Dale Wylie, E. C. Webb.

Exhibiting: Residential, commercial and industrial oil burners; residential winter air conditioner oil furnaces; commercial-industrial combination gas-oil burners. Residential winter air conditioner furnaces will be featured.

PETROMETER CORP. — see LIQUIDEPTH INDICATORS, INC.

PITTSBURGH CORNING CORP., 307 4th Ave., Pittsburgh 22, Pa.—Booth 338

PITZ FOUNDRY, INC.—see AMERICAN HYDROVAC DIV.

PLUMBING & HEATING BUSINESS, Grand Central Terminal Bldg., New York 17, N. Y.—Booth 435

Exhibiting: Publication.

PLUMBING & HEATING JOURNAL, 92 Martling Ave., Tarrytown, N. Y.—Booth 2-407

Exhibiting: Publication.

PLUMBING & HEATING WHOLESALER, 92 Martling Ave., Tarrytown, N. Y.—Booth 2-407

Exhibiting: Publication.

PORTABLE ELECTRIC TOOLS, INC., 320-340 W. 83rd St., Chicago 20, Ill.—Booth 2-809

In attendance: George W. Weatherby, Fred S. Sonneborn, John Baker.

Exhibiting: Portable electric tools. Attachments — sanders, polishers, etc. — will be featured.

POWERS REGULATOR CO., 3400 Oakton St., Skokie, Ill.—Booths 428, 430, 432.

In attendance: J. W. Powers, F. A. Murray, D. L. Ladd, K. M. Stevens, E. W. Rietz, E. R. Bowman, T. J. Smith, D. A. MacWatt, E. K. Wagner, G. Fickett, R. G. Lyford, C. C. Quin, R. M. Spencer, E. V. Carlson, C. P. Krantz, G. J. Kraai.

Exhibiting: "No-Pak" radiator valves, "Powerstroke" damper motors, "Unitem" thermostats, "Flowrite" valves will be featured, and "Metalflow" valves, "Accritem" regulators, indicating and recording regulators, water controllers, and thermostatic water mixers will also be shown.

PREFERRED UTILITIES MFG. CORP., 1860 Broadway, New York 23, N. Y.—Booth 142

In attendance: R. S. Bohn, W. H. Bohn, J. S. Kaplan, Kenneth Stevens.

Exhibiting: Unit steam generators (packaged boilers), combination gas oil fired rotary burners; "Draft-a-Justor"; oil burning accessories.

PROPELLAIR DIV.—see ROBBINS & MYERS, INC.

PULLMAN VACUUM CLEANER CO., 33 Allerton St., Boston 19, Mass.—Booth 2-605

In attendance: Robert Berns, Jack Welker, Norm Ruby, L. J. Krause, Mason Emanuels.

Exhibiting: Furnace vacuum cleaner; industrial vacuum cleaner; tools and accessories. Disposable paper filter accordion hose will be featured.

PUR AIR DIV., AMERICAN SOLVENT RECOVERY CORP., 8th & Cassady Aves., Columbus 19, Ohio.—Booths 2-427, 2-429

In attendance: Arthur W. Cox, Sr., William H. Whirl, Arthur W. Cox, Jr., Donald C. Hall, Daniel B. Gartrell.

Exhibiting: Activated, coconut shell carbon equipment for removing odors in inhabited spaces, including "Filter Fold," panel adsorber, and canister, all to be installed in air conditioning systems, and self-contained units to be used in non-air conditioned spaces. Live demonstration of how carbon adsorbs odors will be featured.

PYLE-NATIONAL CO., 1334 N. Kostner Ave., Chicago 51, Ill.—Booth 246

In attendance: G. K. Raider, W. F. Botensten, J. W. Smith, D. I. Packard, E. Kurek, E. Bratko.

Exhibiting: "Multi-Vent" low velocity air diffusing ceiling panels for all types of ceilings. Modular panels for acoustical metal pan ceilings, and a special exhibit showing application and performance, will be featured.

QUINCY STOVE MFG. CO., 825 S. Front St., Quincy, Ill.—Booth 921

In attendance: Herman D. Tow, Clarke T. Welsh, Al Swartzmiller, Maurice Davis, Harvey J. Wilde.

Exhibiting: "Monogram" oil wall furnace and oil space heater. "In-The-Wall" oil wall furnace vaporizing burner will be featured.

RCS TOOL SALES CORP., 200 Moen Ave., Joliet, Ill.—Booths 326, 328

In attendance: Francis S. Russell, Thos. M. Sweeney, Dale Davis, Carl Longanecker, Ray Westlund, Jr., George Schultz.

Exhibiting: "Super Saw" reciprocating, roughing-in, portable power attachment; "Korner King" right angle drill attachment, which will be featured.

RADIANT-RAY RADIATION, INC., 900 W. Main St., New Britain, Conn.—Booth 2-620

RADIANT UTILITIES CORP., 8817 18th Ave., Brooklyn 14, N. Y.—Booth 321

In attendance: Jacob G. Goldberg, Julius S. Goldberg, Arthur A. Marcus, Joseph Bloom.

Exhibiting: Oil burners and warm air furnaces (winter air conditioners).

RADIATION FURNACE CORP., 230 Bond, Benton Harbor, Mich.—Booth 520.

In attendance: Robert Volk, Sidney Volk, Gus Paul.

Exhibiting: Oil and gas warm air furnaces.

RALPH MFG. CO. INC., 927 Broad St., Wadsworth, Ohio—Booths 1233, 1235

In attendance: Ralph T. Jenkins, Raymond G. Jenkins, Carl L. Jenkins, A. J. Ralph, E. M. Jenkins, B. J. Jenkins.

Exhibiting: Complete line of furnace pipe and fittings, including new forced air 4 in. system, which will be featured.

RANDALL GRAPHITE BEARINGS, INC., Greenlawn & Lake Sts., Lima, Ohio—Booth 1215

In attendance: W. E. Dickerson, K. W. Strunk, R. C. Jamison, Harry Koeckritz, Howard Dickerson, J. F. Pikal, H. C. Peterson, Virgil Fitch, Ray Chaney.

Exhibiting: Self-aligning, self-lubricating pillow blocks; flange units, graphite bearings, bronze bushings; safety collars and washers. New flange sleeve bearing unit, self-aligning, self-lubricating, available with sintered or graphited bearings, and special prepacked, lubricated for life bearings suitable for operating temperatures of -10 F to 165 F, especially designed for heating, ventilating and air conditioning equipment, will be featured.

REDMOND CO., INC., Owosso, Mich.—Booth 2-421

REFRIGERATION APPLIANCES, INC., 901-923 W. Lake St., Chicago 7, Ill.—Booth 2-127

REMINGTON ARMS CO., INC., 939 Barnum Ave., Bridgeport 2, Conn.—Booth 2-126

In attendance: C. C. Clair, C. A. Nash, C. J. Turner.

Exhibiting: Stud driver. Duct suspension from concrete ceiling, special guards for conduit clips, and "instant fastening" of light gage metal to steel and concrete will be featured.

RESEARCH PRODUCTS CORP., 1015 E. Washington Ave., Madison, Wis.—Booth 421

In attendance: A. W. Brown, John G. Schutz, P. N. Dutton, Carl B. Rowe, H. E. Whelpley, K. H. Lindquist.

Exhibiting: Replacement and washable air filters; odor removal filters, washable grease filters; paint arrestors; special applications of a wide range of types, sizes and shapes. Complete line of panel air filters with new applications of new filtering techniques, flexibility in design being the primary aim, will be featured.

RHEEM MFG. CO., 570 Lexington Ave., New York 22, N. Y.—Booth 2-438

In attendance: R. C. Anderson, A. F. Cassidy, V. J. Heinis, E. J. Hutchings, E. F. Malarkey, J. J. Nangle, W. H. Olson, T. L. Schwertfeger, M. A. Straub.

Exhibiting: Gas and oil burning furnaces; gas fired wall heaters and water heaters. "Coppermatic" water heater, oil burning furnace, gas fired counterflow furnace, and gas fired wall heater will be featured.

RIDGE TOOL CO., 400 Clark St., Elyria, Ohio —Booths 2-118, 2-120

In attendance: E. C. Bliss, L. C. Richardson, R. C. Chamberlin, M. M. Fried, W. L. Parcell.

Exhibiting: Pipe tools. New "500 Ridgid" pipe and bolt threading machine will be featured.

RITTLING CORP., 1202 Rand Bldg., Buffalo 3, N. Y.—Booth 446

In attendance: F. W. Thompson, F. W. Helikson, J. B. Howard, H. F. Haldeman, Geo. Washington, Jr., B. G. Peterson, B. R. Peterson, H. J. Lippke, F. L. Nelson, E. B. Nickerson, W. G. Mussun, Jr., Reaver Culbertson, Bryce Byard, Oliver Holmes, N. T. O'Rourke, J. Swanson, G. R. McKenzie, J. O. Moore, H. G. Richardson, Jr., J. L. Harvey, C. R. Bredeson, J. B. Rittling, R. W. Rittling, C. P. Rittling, R. J. Carter.

Exhibiting: Unit heaters; baseboard heating; finned tube convector radiators; cabinet convectors; "Sil-Type" heating. "Sil-Type" heating and improved new type of baseboard heating will be featured.

ROBBINS & MYERS, INC., PROPELLAIR DIV., 1345 Lagonda Ave., Springfield, Ohio Booths 2-815, 2-817

In attendance: M. L. Aitken, W. J. Helmer, E. J. Stone.

Exhibiting: Industrial ventilating fans (roof ventilators, vaneaxial, direct connected); "All-Weather" motors; attic fans and commercial fans.

ROBERTS-GORDON APPLIANCE CORP., 44 Central Ave., Buffalo 6, N. Y.—Booths 414, 416, 420

In attendance: W. Stuart Gordon, Jr., L. C. Smyth, R. I. Warnecke, W. E. Davis, R. T. Huyck, Edw. Neumann, R. G. Budden, John Crim, Robert Keller.

Exhibiting: Gas conversion burners, combination gas-oil conversion burners, hot water boiler, forced warm air furnace, "Hi-Boy" forced warm air furnace, "Nordensson" type gas conversion burner and combination gas-oil conversion burner; gas unit heater. Combination gas-oil burners for domestic and industrial use will be featured.

ROBERTSHAW-FULTON CONTROLS CO.—see FULTON SYLPHON DIV.

ROME-TURNEY RADIATOR CO., 109 Canal St., Rome, N. Y.—Booth 2-319

In attendance: William L. Lynch, John J. Boylan, Edwin J. Parry, E. L. A. Forster, Joseph M. Shannon, Francis M. Larkin, Thomas Murphy.

Exhibiting "ROCOP" convector radiators; "Ro-Fin" baseboard radiation.

ROYAL HEATERS, INC., 1024 Westminster Ave., Alhambra, Calif.—Booth 527

In attendance: Hal G. Merkel, Leo Glascock, Russ Smith, J. H. Scruton, R. T. Lowrie.

Exhibiting: "Jet Flow" heating equipment. New line of forced air furnaces, conventional counterflow for natural manufactured and LP gases, will be featured.

SARCO CO., INC., Empire State Bldg., New York 1, N. Y.—Booths 1201, 1202

In attendance: R. W. Cumming, L. Barfus, M. J. Marion, G. B. Burke, C. E. Brakenridge, R. L. Stewart, E. G. Avery, D. E. Shrader, O. W. Clark.

Exhibiting: Thermostatic, bucket, liquid expansion, and float-thermostatic steam traps; radiator valves and traps; water blenders; temperature regulators. "Sarcotherm" weather compensating control systems will be featured.

SCHNACKE INC., 1107 N. Governor St., Evansville, Ind.—Booth 2-201

Exhibiting: Compressors and condensing units, 5 to 60 hp. Home air conditioner package unit, 3-5 ton, a new product, will be featured.

SCULLY SIGNAL CO., 88 First St., Cambridge 41, Mass.—Booth 504

In attendance: Frank P. Scully, Carl A. Goddard, A. F. Gray, F. P. Scully, Jr., W. G. Rowell, Harold Forrest.

Exhibiting: "Ventalarm" signals and gages. Two new devices are expected to be ready for showing.

SEQUOIA MFG. CO., 1000 Brittan Ave., San Carlos, Calif.—Booth 2-139

In attendance: J. V. Dean, Art. Theobold, Allison Scott, Howard Patterson, Bill Webster, Bill Dunbar, John Davis, Roger Lauback, Mac Stransky.

Exhibiting: Three types of gas forced air furnaces — horizontal, "Closet'eer", and new reverse flow.

SERVEL, INC., Evansville 20, Ind.—Booths 1129, 1131, 1133

In attendance: John A. Gilbreath, H. C. Pierce, F. A. Grossman, J. O. Yund, R. C. Marbach, J. M. Townsend.

Exhibiting: Gas-, oil- and steam-operated all-year air conditioners; 25 ton water chiller.

SHEET METAL WORKER, 92 Martling Ave., Tarrytown, N. Y.—Booth 2-407

Exhibiting: Publication.

SIEMON MFG. CO., 1819 Holmes St., Kansas City 8, Mo.—Booth 2-404

In attendance: Chas. D. Jones, R. H. Siemon, M. J. Murray, Roland W. Brown, Chas. Byrum, Gerald Schwarz, Kenneth J. Hilsenbeck.

Exhibiting: Complete line of power and atmospheric gas and combination gas-oil burners. New power-flame forced draft gas burners and eight models of power type combination gas-oil burners—gun type design, electronically controlled, factory wired and shipped completely assembled — will be featured.

SKUTTLE MFG. CO., 4099 Beaufait Ave., Detroit, Mich.—Booth 2-819

SMITH CORP., A. O., P. O. Box 584, Milwaukee 1, Wis.—Booth 1340

In attendance: J. V. Pepin, P. S. Cornell, S. E. Wolkenheim, L. H. Hoelter, D. A. LeRoy, D. D. Williams, J. W. Long, G. Fohey.

Exhibiting: Volume water heaters; warm air furnace; "Permaglas" water heaters; gas conversion burners; gas-fired boilers. Gas fired warm air furnace will be featured.

SMITH CO. INC., H. B., 57 Main St., Westfield, Mass.—Booths 217, 221

In attendance: Stanley K. Smith, John E. Reed, A. L. Lawrence, T. C. O'Connor.

Exhibiting: "Smith Century" gas boiler; No. 100 oil boiler-burner unit; No. 44 "Mills" boiler; "Sterling" extended finned surface radiation. The new gas fired unit will be introduced at the show, which will be the first showing of this new product.

SOUTHWEST MFG. CO., P. O. Box 28, Aurora, Mo.—Booth 2-340

In attendance: B. J. Hart, F. P. Munsinger, Rudie Lorenz, W. C. Blackwell, B. L. Clarke, Conrad Coulter, Del Ramey, Albert R. Smith, M. L. Queen, F. W. Siffert, C. M. Dillon, Ray W. Deeks.

Exhibiting: Gas fired floor furnaces; gas fired wall heaters; and featuring gas fired forced air furnaces.

SPARKLER MFG. CO., Lake St., Mundelein, Ill.—Booth 2-920

In attendance: G. Harry De Graw.

Exhibiting: Filters for fuel oil for domestic and industrial installations.

SPENCER THERMOSTAT DIV., METALS & CONTROLS CORP., 34 Forest St., Attleboro, Mass.—Booth 720

In attendance: V. G. Vaughan, J. Ottmar, F. Appleton, J. Bagnall, J. Derby, R. Glidden, C. Grube, B. Haun, E. Jastram, N. Naylor, E. Kurtz, T. O'Keefe, R. Peck, N. Curtis, A. White, W. Kuehl, A. Payette, Jr., U. Savolainen, F. Stearns, R. Morse, W. Peirce, R. Mawney, J. Duffy, J. Moorhead, J. Rowland, R. Sayers, F. Oshner.

Exhibiting: "Klixon" hermetically sealed defrost thermostat; dome mounted protectors for hermetics; motor starting relays; snap-acting thermostats; circuit breakers; safety shutoff valves for gas refrigerators; "Truflex" thermostat bimetal; electrical contacts. New composite and clad metals, will be featured.

STAINLESS & STEEL PRODUCTS CO.—see CERTIFIED FURNACE CO.

STANDARD STAMPING & PERFORATING CO., 3131 W. 49th Pl., Chicago 52, Ill.—Booth 317

In attendance: William V. Ramquist, Lloyd Stone, Andrew Lavella.

Exhibiting: Registers; grilles; perforated metals. Perimeter baseboard and floor registers will be featured.

STEEL PRODUCTS ENGINEERING CO.—see COMBUSTIONEER DIV.

STEPHENS-ADAMSON MFG. CO., Ridgeway Ave., Aurora, Ill.—Booth 2-806

In attendance: C. B. Hurd, C. F. King, G. I. Marsh, R. C. Calvin.

Exhibiting: "Sealmaster" ball bearing units. Zone hardened inner race on units which leaves end of race soft for better set screw holding, and induction hardening around ball path only on inner race, will be featured.

STEWART MFG. CO., INC., Grove Ave., Cedar Grove, N. J.—Booth 530

In attendance: Fred J. Stewart, Russell D. Anderson, William J. Fembleaux.

Exhibiting: Air conditioning registers and grilles and air volume controls. "Scoopmaster", combining "Scooptrol" and outlet, will be featured.

STEWART-WARNER CORP., SOUTH WIND DIV., 1514 Drover St., Indianapolis 7, Ind.—Booths 926, 928

In attendance: W. E. Judd, R. F. DeVaney, Gus Wolf, John Gregg, Robert A. Olsen, William W. Pace, Robert C. Overmyer, Frank A. Ryder, George Allen, Joseph P. Boland, Max J. Anthony, Cecil A. Patrick.

Exhibiting: "Saf-Aire" wall heaters of 14,000, 20,000 and 30,000 Btu per hr capacities.

STRATTON & TERSTEGGE CO., INC.—see ANCHOR DIV.

STRONG, CARLISLE & HAMMOND CO., 1392 W. 3rd St., Cleveland, Ohio—Booth 2-310

In attendance: S. E. Adams, H. H. Maltbie, I. J. Lowden, H. T. Brazier, J. A. Rodeno, R. L. Clark.

Exhibiting: Steam traps; reducing valves; strainers; separators. "Borgana" boiler water treatment and "Hi-Cap" steam traps will be featured.

STURTEVANT DIV., WESTINGHOUSE ELECTRIC CORP., Hyde Park, Boston, Mass.—Booth 814

SUNDSTRAND ENGINEERING CO., 1325 Seventh St., Rockford, Ill.—Booth 941

In attendance: R. H. Gustafson, A. H. Rutledge, Wayne Hallinan.

Exhibiting: Complete line of pressure type oil burners.

SUNDSTRAND MACHINE TOOL CO., HYDRAULIC DIV., 2421 11th St., Rockford, Ill.—Booths 115, 117

In attendance: C. W. Lang, L. H. Schuette, W. G. Jarvis, B. L. Soderberg; J. F. Rosenthal, O. E. Mayfield, J. F. Griffey, B. F. Olson, W. R. Kiefer, R. E. Stevens, B. L. Douglass, L. T. Stoyke, S. Ferraro, R. J. Murphy, R. W. Erikson, Paul Johnson, C. L. Sadler, Charles Wells, A. C. Kaser.

Exhibiting: Fuel units. New low pressure air-oil fuel unit will be featured.

SUN-RAY BURNER MFG. CORP., 139-24 Queens Blvd., Jamaica, N. Y.—Booths 2-424, 2-426, 2-428

In attendance: Martin Sones, Robert Adcock, Alfred Luft, Alfred Metzger, Gabe Marin, Don Caldwell, Frank Sieffert, Chick Meehan, Lester Baughman.

Exhibiting: Complete line of oil burners ranging in size from ½ to 25 gph in both conventional and models incorporating the Shell combustion head. New Model VS burner, under fire, will be featured.

SURFACE COMBUSTION CORP., 2375 Dorr, Toledo 1, Ohio—Booths 1337, 1339, 1343

In attendance: H. C. Gurney, R. A. Bell, W. J. Grover, C. C. Owen, L. J. Monahan, R. B. Thornburgh, W. R. Egan, H. A. Gross, A. Baker, F. S. Hamer, H. T. Gates, G. W. Stark, T. J. Langan, J. W. McAfee, J. G. Robinson, R. R. Ramsay, W. M. Adams, E. E. Barr, R. A. Caylor, C. H. Langendorf, R. A. Reed, R. B. Hoover, R. R. Sandusky, E. J. Michalak, L. Schaefer, S. F. Schultz, A. G. Overcashier, W. D. Shoemaker, R. E. Ireland, F. H. Adams, C. B. Phillips.

Exhibiting: Oil and gas fired winter air conditioners; hot water and steam boilers; unit heaters. Horizontal winter air conditioner will be featured.

SUTTON CORP., O. A., VORNADO DIV., 1812 W. 2nd St., Wichita, Kans.—Booth 429

In attendance: Austin Rising, Earl H. Renfro, Fred Kaths, Allan B. Chardrow, Ray Thompson.

Exhibiting: "Vornado" room air conditioners; air circulators, desk and pedestal type; window fans, turnabout, reversible; heater fans. New ½ hp room air conditioner will be featured.

SYNCROMATIC CORP., 1141 10th St., Watertown, Wis.—Booth 721

In attendance: R. C. Jaye, H. M. Stillman, J. F. Hirtz, J. S. Sullivan, G. L. Day, J. W. Hatch, E. R. Zobel, L. H. Troeller, G. M. Galloway.

Exhibiting: Steel warm air heating equipment (gas, oil and coal), both residential and industrial; oil burners.

TACO HEATERS, INC., 137 South St., Providence 3, R. I.—Booths 1027, 1029

In attendance: J. H. White, J. R. Murphy, E. T. Houlihan, J. Balter, R. T. Schoener, R. T. Angevine, W. E. Johnson, J. W. Falle, and representatives of Fenner & Potvin, Inc.

Exhibiting: Water heaters; chillers; air valves; circulators; tempering valves; venturi; relief and reducing valves; flow check valves; "Air Scoop," "Paneltrol;" and "Tacomatic". "Air Scoop" will be shown in operation to demonstrate what it does.

TANN CORP.—see CONGRESS DRIVES DIV.

TECUMSEH PRODUCTS CO., Tecumseh, Mich.—Booth 2-501

In attendance: L. W. Larsen, F. G. Purcell, D. J. Bowen, A. S. Russell, M. A. Shantz, G. B. Boone, G. I. Boone, Jack Swain, R. T. Smith, J. E. Smith, Ralph Hiatt.

Exhibiting: ¾, 1, 1½ and 3 hp hermetically sealed refrigeration compressors; plastic operating models and cutaways. 3 hp hermetic compressor designed for year around air conditioning systems will be featured.

TEMCO, INC., Nashville 9, Tenn.—Booth 547

THATCHER FURNACE CO., Center St., Garwood, N. J.—Booth 634

In attendance: C. Sahler, F. L. Cowell, M. C. Beard, R. M. Cook, W. J. Kihn, G. J. Cabarack, W. White, H. Sparks, C. Allen, A. MacMillan, J. Kelly, Ray Gaebler, Ralph Gaebler, C. Keyes, L. Baughman, J. C. Meehan, J. Daly, F. W. Sieffert, H. S. Gibbard.

Exhibiting: Oil fired and gas fired winter air conditioners, gas fired gravity furnaces, and oil fired and gas fired boilers. Horizontal gas fired winter air conditioner will be featured.

THRUSH & CO., H. A., Peru, Ind.—Booths 2-409, 2-411

In attendance: E. D. Noland, W. C. Miller, R. Lowe, T. G. Haupt, G. H. Fox.

Exhibiting: Complete line of forced circulation flow control system of hot water heat; low and high pressure reducing and relief valves; dual control units, cast iron and bronze, adjustable and nonadjustable; one pipe supply tees and electrical controls. New horizontal circulator and ASME low pressure relief valve will be featured.

TILO ROOFING CO., INC.—see GLASFLOSS DIV.

TIMKEN SILENT AUTOMATIC DIV., TIMKEN-DETROIT AXLE CO., 209 E. Washington St., Jackson, Mich.—Booths 332, 334, 336

In attendance: C. A. Cooper, R. M. Marberry, E. H. Haugen, F. H. Huber, K. O. Ralphs, W. J. Chappell.

Exhibiting: Gas-fired and oil-fired heating equipment: conversion burners, furnace-burner and boiler-burner units; oil-fired domestic water heaters. Complete new line of gas-fired forced warm air furnaces will be introduced, consisting of three counterflow units from 75,000 to 125,000 Btu input; six low furnace units and six high furnace units, each ranging from 75,000 to 200,000 Btu input.

TITUS INC., P. O. Box 598, Waterloo, Ia.—Booth 2-520

In attendance: R. W. Titus, D. L. Titus, J. S. Smith, J. L. Canady

Exhibiting: #50, #100 and #150 perimeter diffusers; T-700 series "No-Vision" door and partition grilles; #1001 return air grilles. The new perimeter diffusers for residential heating and cooling will be featured.

TITUS MFG. CORP., 113 E. 8th St., Waterloo, Ia.—Booth 2-200

In attendance: Don L. Titus, Robert W. Titus, J. D. Davis, E. F. Averill, J. S. Smith, E. B. Boston, R. B. Hudson.

Exhibiting: "Airfoil" air conditioning registers and grilles. New No. 100 perimeter diffuser for residential combined heating and cooling work, and new complete extruded aluminum grille, will be featured.

TORRINGTON MFG. CO., 70 Franklin St., Torrington, Conn.—Booths 410, 412

In attendance: Dudley B. Robinson, Roger T. Lyman, Merrill B. Hunting, Archibald C. Doty, Jr., Leonard C. Lindstrom.

Exhibiting: Fan blades and blower wheels, and featuring new "slinger-ring" fans and new "LU" one-piece fan.

TRANE CO., La Crosse, Wis.—Booths 615, 627

In attendance: Thomas Hancock, E. A. Cline, A. C. Menke, C. R. Connor, C. L. Ringquist, R. E. Haskins, R. S. Knowles, H. C. Rooks, W. C. Dackis, M. L. Hoglund, G. E. Hicke, R. E. Lee, V. E. Bushnell, R. G. Lubinsky, L. R. Fuller, F. Sontag, L. Scafe, and others.

Exhibiting: Centrifugal water chiller "CenTra-Vac"; reciprocating compressors; reciprocating water chillers; self-contained air conditioners; unit air conditioners "Climate Changers"; centrifugal fans; baseboard; convectors; finned radiation, gas unit heaters; propeller unit heaters; blower unit heaters; projection unit heaters; unit ventilators; steam specialties; hot water products; air conditioning systems. Hermetic compressor; air reducer for hot water systems; two and three row wall-fin cabinets and grilles; collection of air conditioning equipment in which all refrigeration piping is done at factory; centrifugal water chiller, self-contained units; reciprocating water chiller — unit air conditioner combination; self-contained air conditioners; and self-contained air conditioner with built-in evaporative condenser will be shown in operation.

TRERICE CO., H. O., 1420 W. Lafayette Blvd., Detroit 16, Mich.—Booths 2-414, 2-416

In attendance: Frank Barclay, Herbert Jones, S. B. Mercer, J. L. Brackett, H. M. Trerice.

Exhibiting: Thermometers; temperature and pressure controls; compressed air filters; steam traps; pressure gages. Electric contact temperature controller will be featured.

TRION, INC., 1000 Island Ave., McKees Rocks, Pa.—Booths 133, 135, 137

In attendance: Edgar W. Meyers, Jr., George F. Landgraf, Paul W. Aitkenhead, John W. Frazier, Russell W. McGuire, William R. Murdock, John M. Newton, Richard E. Sweitzer.

Exhibiting: Complete line of electronic air cleaners for industrial, commercial and residential applications. A special smoke device demonstrating the principle of electrostatic precipitation will be shown, and a continuous demonstration of the built-in water washing system on an industrial unit will be given.

TURB O TUBE FURNACE INC., 204-208 Rhode Island St., Buffalo 13, N. Y.—Booth 209

In attendance: J. B. W. Carmichael, D. L. Haynes, E. G. Kinkel.

Exhibiting: Forced warm air furnaces: hi-boys, lo-boys; suspended models; gas models. Oil fired counterflow hi-boy will be featured.

TUTHILL PUMP CO., 939 E. 95th St., Chicago 19, Ill.—Booth 2-214

In attendance: H. T. Kessler, J. D. Young, R. H. Clarke, H. J. Deiters, C. L. White.

Exhibiting: Model 30A5G "Fuelstat" for domestic oil burners; model SU slow speed heavy oil units for industrial oil burners.

TUTTLE & BAILEY, INC., Corbin Ave., New Britain, Conn.—Booth 2-305

In attendance: J. H. Smart, W. L. Lipski, R. S. Rickabaugh, R. D. Tutt, H. H. Van Epps, F. W. Adams, W. L. Batchelor, L. B. Wilson.

Exhibiting: Grilles; registers; dampers, ceiling diffusers; high pressure air diffusers; copper convectors; fin tube radiation; baseboard convectors. New style adjustable pattern control diffusers, high pressure air diffusers, opposed blade damper, fin tube radiation, and baseboard convectors will be featured.

XXTH CENTURY H. & V. CO., 96 Ira Ave., Akron 1, Ohio—Booths 111, 113

In attendance: R. K. Long, J. G. Kerch, C. E. Tomlin.

Exhibiting: Gas and oil fired furnaces. New style of oil fired reverse flow furnace will be featured.

TYPHOON AIR CONDITIONING CO., INC., 794 Union St., Brooklyn 15, N. Y.—Booths 1322, 1324, 1326

In attendance: Don V. Petrone, John E. York, Peter T. Wotton, Arthur H. Farr, Sam F. Graziano, Larry D. Spence.

Exhibiting: Packaged air conditioning equipment; residential heating and cooling unit; "Prop-R-Temp" heat pump. Current trend toward the residential year 'round air conditioning market will be featured, and heating and cooling unit for homes with "One-Button" control, which enables the user to switch from heating to cooling without manipulating dampers or without damper motors and controls, will be displayed at a major trade exposition for the first time.

U. S. MACHINE CORP., Lebanon, Ind.—Booths 1328, 1330, 1332, 1334, 1336, 1338

UNITED STATES AIR CONDITIONING CORP., Como Ave. Southeast at 33rd, Minneapolis 14, Minn.—Booth 2-228

In attendance: D. E. Feinberg, L. P. Hanson, Wm. Moiselle, M. A. Stuart, T. J. Waddell, R. D. McLain, L. R. Gordon, C. F. Hawkinson, E. R. Tanner, R. A. Nelson, C. S. Kessler, M. L. Benson, R. I. Tanner, A. J. Mallinckrodt, J. McMillin, H. Fessler, E. J. Conley.

Exhibiting: Model ECU-87150 evaporative condenser; Model HC-300 "Modu-aire" heating and cooling unit; Model 23100 gas fired unit heater; Model DRK-20B dual circuit refrigerated "Kooler-aire"; Model 8120 home air conditioner; Model 7750E store conditioner; Model 7975D2 window type room air conditioner; Model CH 18 housed ventilating set. Home air conditioner will be displayed for the first time, and exhibit also includes 1953 window unit which has been completely redesigned, as well as new evaporative condenser line and gas fired unit heaters.

UNITED STATES RADIATOR CORP., 300 Buhl Bldg., Detroit 26, Mich.—Booth 620

In attendance: S. Wolpert, J. Finn, F. Mulcahy, Jr., R. Walker, J. McNulty, R. Strausser, W. F. Hershey, J. T. Kos, J. A. Froncek, C. T. Lawrence, A. X. Bergeron, L. J. Finn, E. Keim.

Exhibiting: Cast iron boilers; cast iron radiators; radiant baseboard; warm air furnaces.

UNITED STATES RADIATOR CORP.—also see PACIFIC STEEL BOILER DIV.

UNITED STATES REGISTER CO., Battle Creek, Mich.—Booths 431, 433

In attendance: Charles J. Pearson, A. A. Stagg, Harry G. Hollman, E. P. Kromdyk.

Exhibiting: Complete line of gravity and air conditioning registers for heating, ventilating, cooling, etc., and registers for perimeter heating and general heating and ventilating.

UNITED STATES STEEL CO., 525 William Penn Pl., Pittsburgh 30, Pa.—Booths 1012, 1014, 1016

UNIVERSAL DIFFUSER CORP., 890 Whittier St., New York 59, N. Y.—Booth 2-107

In attendance: Charles Davies, Alfred Stern, Robert Stern, B. A. Kane, H. Himelblau.

Exhibiting: "Flexiflo" air diffuser, with an effective area "that is 100 percent variable and thus permits perfect volume control without requiring additional dampers." One of the diffusers has an automatic control on it that permits variation of volume through thermostats or humidistats. Exhibit will show diffusers in action; automatic controls will open and close the diffusers in order to demonstrate their advantages.

UTILITY APPLIANCE CORP., 4851 S. Alameda St., Los Angeles 58, Calif.—Booth 2-701

In attendance: C. F. Cushing, Bernard Harris, Richard Petersen, T. M. Northcote.

Exhibiting: Complete line of gas fired heating equipment, evaporative air coolers; centrifugal blowers. 90,000 Btu horizontal forced air furnace will be featured.

VAN-PACKER CORP., 209 S. LaSalle St., Chicago 4, Ill.—Booth 1325

In attendance: R. F. Van Alstyne, L. Packer Brown, Ken Mayer, Wayne Bradfield, Joe Hemingway.

Exhibiting: All fuel packaged masonry chimney.

VAPOR HEATING CORP., 80 E. Jackson Blvd., Chicago 4, Ill.—Booth 2-130

In attendance: L. H. Gillick, George M. Egart, Don Heaton.

Exhibiting: "Vapor-Clarkson" steam generator; a complete automatic package steam generator which develops 200 lb steam pressure in 2 min from cold water and makes 1000 to 5000 lb per hr of steam per hr at from 10 to 600 lb steam pressure; steam generator which produces 500 lb per hr of steam at 10 to 300 lb pressure; mercury contact thermostats used to control temperatures in railroad trains, jet airplanes and industry and that anticipate temperature change; other heating equipment.

VELOCITY POWER TOOL CO., 7505 Thomas Blvd., Pittsburgh 8, Pa.—Booth 2-435

In attendance: William G. Kulesz, William S. McConnell.

Exhibiting: "Velocity Power" driver and "Century Torch-O-Matic" gas gun.

VIBRATION ELIMINATOR CO., 10-20 47th Ave., Long Island City 1, N. Y.—Booths 911, 913

In attendance: S. Kahn, M. Miller, E. Vieira, L. Imbert.

Exhibiting: Units and bases for the elimination of vibration transmission from machinery.

VIKING AIR CONDITIONING CORP., 5600 Walworth Ave., Cleveland 2, Ohio—Booths 325, 327

In attendance: Marion Levy, Frank Gibbons, Dick Gang, M. F. Mackenzie, Tom McIntyre, Jack Green, Lowell McCord, Jack Carman, Woody Faison, George Gould, Gary Baker, Maurice Esser, Harry Winter, Herbert Klein, Philip Borkat.

Exhibiting: Blower packages; blower assemblies; attic and window fans; window coolers; central cooling units; humidifiers. The window cooling units, central cooling units, and attic and window fans will be featured.

VIKING MFG. CORP., 1747 Chester Ave., Cleveland, Ohio—Booths 1135, 1137, 1139

In attendance: William R. Frasher, E. J. Pratt, James T. Louderback, Evan Steim, Willard Huff.

Exhibiting: Gas and oil furnaces; air conditioning units; "Flatpak" ductwork; registers, boilers; water heaters. New small oil boiler, new low-cost oil furnace, and new furnace and air conditioning unit will be featured.

VILTER MFG. CO., 2217 S. 1st St., Milwaukee 7, Wis.—Booth 2-106

In attendance: M. F. Tokach, J. F. Heil, A. O. Vogel, H. H. McKinnies, J. B. Kupfer.

Exhibiting: Refrigeration equipment, including compressors, condensers, receivers, etc.

VORNADO DIV.—see O. A. SUTTON CORP.

VULCAN RADIATOR CO., 26 Francis Ave., Hartford 6, Conn.—Booth 1116

In attendance: John H. Ehn, Thomas L. Arnold, Richard B. Sweet, Joseph D. Pierce, John B. Rita, James D. Zonino.

Exhibiting: Extended fin surface radiation (ferrous and non-ferrous); commercial "Linovector"; baseboard "Radivector". A new "Linovector" enclosure will be featured with knob operated damper and new cover support brackets.

WAGNER ELECTRIC CORP., 6400 Plymouth Ave., St. Louis 14, Mo.—Booth 2-138

In attendance: L. C. Dobrunz, H. N. Felton, A. C. Allen, E. O. Krueger, J. L. Pasher, W. E. Prewitt, J. G. McClinton, J. T. Kemper, F. H. Vocks, R. E. Bryant, M. J. Scheid, L. A. Murphy, J. J. Scheid, W. H. Gilster, P. D. Young, S. R. Snyder, F. T. Coup, G. B. Minx, G. L. Neely, R. W. Larson, T. A. Wallace, M. H. Nelson, M. B. Atkinson, R. Vassier.

Exhibiting: Electric motors.

WALKER MFG. & SALES CORP., 1701-17 Penn St., St. Joseph 1, Mo.—Booth 2-233

In attendance: M. O. Land, Lakin Meade, Andrew Ziph, R. D. Denning.

Exhibiting: Draft regulators for space heaters; draft controls for furnaces; draft controls for industrial boilers; venturi-top chimney caps; roof ventilators. Complete size range of draft indicating draft regulators and venturi chimney caps will be featured.

WALTON LABORATORIES, INC., 1186 Grove St., Irvington 11, N. J.—Booths 923, 925, 927

In attendance: William Feldermann, John B. Feldermann, J. R. Lewis.

Exhibiting: Humidifying equipment; dehumidifying equipment; humidity controls; dehumidifying control; indicators. "Sherwood" table model humidifier designed for small homes or apartments. "Aqua-Sorber" dehumidifier with 1/5 hp motor and equipped with automatic control will be featured, as will a new atomizing type furnace humidifier to be shown for the first time.

WATERMAN WATERBURY CO., 1621 N. E. Jackson, Minneapolis 13, Minn.—Booth 834

In attendance: Harry Cross, Dave Sedgwick, Stuart Smith, Ben Schwarz, Tom Delaney, Roy Lonson, Ira Metcalf, Fritz Legler, Frank McConnell, Bill Morrisey, Bob Carlson, Jack White, Keith Anderson, Jim Bazille, Brighton Eddy, Everett Borst.

Exhibiting: Year 'round air conditioning unit; oil and gas fired furnaces. A year 'round air conditioning and cooling unit will be introduced.

WATTS REGULATOR CO., 10 Embankment St., Lawrence, Mass.—Booth 2-422

In attendance: George B. Horne, Bernard Alexander, Benjamin G. Robertson, Ralph W. Giffin, Mike Mercury, Richard Bentzien, Robert Sweeney, Ernie Sanger, Harold Schmidt, Joseph M. Beglen.

Exhibiting: Complete line of heating and plumbing safety valves and controls, including temperature and pressure relief valves pressure reducing valves, water tempering valves, vacuum relief valves, siphon vacuum breakers, feedwater pressure regulators, ASME boiler safety relief valves, dual control units for water boilers, low water cutoffs and boiler water feeders. New high pressure boiler water feeder and diaphragm operated steam pressure reducing valves will be featured.

WAYNE HOME EQUIPMENT CO., INC., 800 Glasgow Ave., Fort Wayne 4, Ind.—Booth 2-136

In attendance: B. G. Duer, C. A. Copeland, J. M. Messinger, P. W. Gotsch, A. A. Jeffrey, Jack Nace, N. G. Berghoff, W. I. Chapel, J. A. Fletcher, W. I. Chapel, B. L. Clarke, E. W. Defries, L. A. Oswald.

Exhibiting: Oil burners, gas burners, oil and gas furnaces. "Residential" 1953 oil burner will be featured.

WEBSTER & CO., WARREN, 17th & Federal Sts., Camden 5, N. J.—Booths 409, 411, 413, 415

In attendance: H. F. Marshall, D. F. Bennett, N. W. MacNichol, B. F. Lerch, L. H. Plum, D. E. Morgan.

Exhibiting: Steam and hot water heating systems and equipment and traps, valves, steam heating specialties, heating controls, convector radiation and baseboard heating.

WEBSTER ELECTRIC CO., 1900 Clark St., Racine, Wis.—Booth 2-239

In attendance: B. T. Wiechers, H. B. Hastings, R. Tollner, J. H. Lahey, L. Ehrich, T. Woolf.

Exhibiting: Electric fuel-units and ignition transformers.

WEIL-McLAIN CO., Michigan City, Ind.—Booth 726

In attendance: R. M. Stockwell, P. R. Stockwell, J. E. Sorensen, P. Hitch, J. A. McDonnell.

Exhibiting: "Snug" baseboard, "Raydiant" recessed radiator; "Solray" radiator, gas fired boiler; oil fired boiler; heavy duty boiler. Feature of exhibit will be baseboard room scene with typical boiler hookup; animation of this room scene will show the effect in the room during operation of the boiler and circulating pump.

WEIL PUMP CO., 1530 N. Fremont St., Chicago 22, Ill.—Booths 2-805, 2-807

In attendance: R. T. Sheridan, W. L. Luther, J. D. Spooner, L. V. Woolum, E. A. Ehrlich, F. Feder, J. Palumbo.

Exhibiting: Submersible sewage ejectors, condensate pumps, hot water circulating pump. Working model of new submersible sewage ejector will be featured.

WESTINGHOUSE ELECTRIC CORP., 511 Wood St., P. O. Box 868, Pittsburgh 30, Pa. —Booth 626 (Also see Sturtevant Div.)

WHEELER-ECONOMY HEATING PUMPS, 19th & Lehigh Aves., Philadelphia 32, Pa. —Booth 2-232

In attendance: J. M. Sperry, B. S. Tucker, J. U. Engelbrink, Frank Love, R. H. Thomas, A. W. Kerr.

Exhibiting: Return line vacuum heating pumps; condensate pumps; circulators.

WHITE-RODGERS ELECTRIC CO., 1209 Cass Ave., St. Louis 6, Mo.—Booths 930, 932, 934

In attendance: J. Newman, J. A. Rodgers, Jack Searls, R. H. Ewert, Ed Robinson, R. Weber, D. O. Eggert, E. E. Harwood, A. E. Petersen, R. Sherer, W. Chesboro,

L. P. Williams, C. Garner, C. C. Rennecamp, E. Wechsler, John Jung, W. Bowen, G. Powell, C. Fredericks.

Exhibiting: Complete line of automatic controls for heating and air conditioning.

WILDER MFG. CO.—see HOUSE & CO., T. S.

WILLIAMS GAS-O-MATIC and WILLIAMS OIL-O-MATIC DIVS.—see EUREKA WILLIAMS CORP.

WINDMASTER CORP., 899 Ingleside Ave., Columbus 8, Ohio—Booth 2-337

WING MFG. CO., L. J., Vreeland Mills Rd., Linden, N. J.—Booth 447

In attendance: H. S. Wheller, C. H. Smith, T. Peyrek, G. Nash, D. Burns, C. Diemecke, T. Schenke, Howard Kister, H. J. Clemens, Al Stellingworth, H. Roller, I. Geiger, C. Flarsheim, H. Johnson, Ed Scott, F. L. O'Neill, Thomas Danforth.

Exhibiting: "Draft Inducer"; turbine blower, "EMD" blower; turbine; electric heater; "VT" heater section; revolving heater; transformer cooling fan; fan wheels; straight line duct fan; elbow type duct fan; "Wing Foil" safety fan. New line of electric heaters will be featured, and electric revolving, fixed vertical and horizontal discharge unit heaters will be exhibited for the first time.

WORTHINGTON CORP., Harrison, N. J.—Booth 824

In attendance: W. H. Feldmann, W. O. Wilson, M. M. Lawler, E. R. Michel, W. F. Bishop, D. H. McCuaig, P. H. Shaw, W. J. Millett, J. Charls, Jr., P. A. McLeod, M. E. Ziegenhagen, J. R. O'Neill, E. C. Hamilton, S. R. Hirsch, R. E. Holmes, G. W. Hartwell, H. Wolf, F. B. Steel, W. C. Cheek, E. W. Vinnedge, R. J. Laidlaw, P. A. Mack, J. A. Klaiber, R. B. Scott, A. W. Fraser, E. Rasa, R. O. Gundlach, J. M. Peterson, J. S. Cavanaugh, C. V. Bengle, J. C. Conrad, D. T. Flynn, F. P. Hagee, R. W. Staehle, H. Griese.

Exhibiting: Centrifugal refrigeration system; "Freon" reciprocating compressor; package liquid chiller; package air conditioners; residential air conditioner; room air conditioners for central system; evaporative condenser; room air conditioner—window type. "Freon" reciprocating compressor is representative of new line of compressor units which range from 3 to 150 hp for air conditioning and refrigeration applications; an exclusive feature is an electric unloader which provides capacity control and starting-unloading. Residential air conditioner, available in 3 and 5 hp sizes, is new. New packaged liquid chiller is representative of line of factory-assembled units in range from 3 to 150 hp for air conditioning and industrial process applications. New room air conditioners, both floor and ceiling mounted in 200, 400, and 600 cfm sizes, for use with central systems, can be used with either chilled or hot water or direct expansion systems. New room air conditioner (self-contained window type) available in ¾ and 1 hp sizes.

YARNALL-WARING CO., Chestnut Hill, Philadelphia 18, Pa.—Booths 2-328, 2-330

In attendance: H. J. Moyer, W. J. Agren, C. H. Simmons, Ralph H. Martin.

Exhibiting: Steam traps; strainers; expansion joints; blowoff valves; water columns and gages. New working model of "Yarway" impulse steam trap and new sound film on this trap will be featured.

YATES-AMERICAN MACHINE CO. — see LIPMAN REFRIGERATION DIV.

YORK CORP., Roosevelt Ave., York, Pa.—Booths 2-225, 2-227, 2-231

In attendance: L. P. Quinlivan, Caron Ehehalt, J. Donald Smith, William C. Moore, J. J. Floreth, John Roth.

Exhibiting: Turbo compressor showing cutaway view and all moving parts; unitary air conditioner; residential air conditioners; store air conditioners; room air conditioners. 1953 line of room air conditioners will be featured.

YOUNG RADIATOR CO., 709 S. Marquette St., Racine, Wis.—Booth 206

Exhibiting: Convectors, "Vertiflow" unit heater; cabinet unit heater; gas-fired unit heater; air conditioning unit. A new coil line will be displayed.

YOUNG REGULATOR CO., 5209 Euclid Ave., Cleveland 3, Ohio—Booth 2-301

In attendance: E. O. Young, W. J. Zimmer, Barton D. Wood, Geo. V. Zintel.

Exhibiting: Direct and remote damper controls; relief and multi-blade dampers; volume control registers and dampers; remote controlled registers; corner pulleys.

ZINK CO., JOHN, 4401 S. Peoria St., Tulsa 1, Okla.—Booth 2-207

ZONOLITE CO., "Z" CRETE DIV., 135 S. La Salle St., Chicago 3, Ill.—Booth 2-131

In attendance: D. C. Goff, L. D. Winkler, W. R. Simpson, W. J. Bein, D. J. Boone, M. T. Phillips, Paul Savoie, Art Best, Phil Strand.

Exhibiting: Underground heated pipe insulation conduit.

The following companies are also exhibiting, but their names were received by the publisher too late for alphabetical listing:

ALCO VALVE CO., 865 Kingsland Ave., St. Louis 5, Mo.—Booth 2-917

BERGER FURNACE MFG. CO., 5920 Center Ave., Pittsburgh 6, Pa.—Booth 1128

DOLLINGER CORP., 9 Centre Park, Rochester 3, N. Y.—Booths 2-705, 2-709

HIDDEN HEAT INC., 64 E. Hoffman Ave., Lindenhurst, N. Y.—Booth 2-408

INGERSOLL PRODUCTS DIV., BORG-WARNER CORP., 321 Plymouth Court, Chicago, Ill.—Booth 2-237

LEE CORP., 1011 Tatnall St., Wilmington, Del.—Booth 2-604

MAXWELL, INC., 200 S. Cherokee St., Denver, Colo.—Booth 2-1001

MEYER FURNACE CO., THE, P. O. Box 989, Peoria 1, Ill.—Booth 2-719

PALMER MFG. CORP., 2200 W. Filmore St., Phoenix, Ariz.—Booth 2-904

SENNA MFG. CORP., 118 Browne St., Spokane, Wash.—Booth 2-900

SUPERIOR COMBUSTION INDUSTRIES, INC., 1475 Broadway, New York 36, N. Y. —Booth 2-205

VACUUM GAS BURNER CO., Main at Elmore, Olean, N. Y.—Booth 2-616

THE LAW AND YOUR PROFITS

Inspect for Building Flaws On Modernizing Jobs

NO DETAIL IS TOO SMALL for meticulous checking when installations of mechanical equipment are made.

Few persons are born under stars as lucky as the hero (name disguised) of the case which follows. The average heating, piping and air conditioning contractor, were he in similar circumstances, might well find his bankroll depleted by some thousands of dollars.

Budget Saving Furniture, Inc., contracted with Tempra Tuer & Co. for a heating unit to be placed in their store. Having completed the installation of the unit and put it into operation, the contractor's men departed — but not before instructing the storekeeper to "leave it burning as set."

At 7 p.m. of the same day, the store employees closed up — "having done nothing at all" to the unit, as they afterwards testified. When they got to the store the next morning, they found that there had been a fire which resulted in considerable damage to the merchandise.

Budget Saving consequently sued Tempra Tuer for damages. The two furniture partners appeared as witnesses and testified as to their reliance upon Tempra Tuer's "skill, judgment and knowledge" of heating and the "quality and fitness" of the unit. Furthermore, said they, the unit was installed at the place chosen by the heating men themselves.

On cross-examination, it transpired that the electric wiring in the building was old and defective—to such extent that the building was rewired immediately after the fire. At no time did the plaintiff furniture store produce more than "a few photographs" to substantiate their claim that the fire originated in the heating unit. "In fact," commented the court, "no expert testified as to what the photographs show; no firemen who went to the scene of the fire and assisted in extinguishing same were introduced to testify." Neither did the policeman who was guarding the store when the proprietors arrived give evidence.

The jury's decision might be called guesswork, due to lack of adequate evidence as to the fire's origin — whether from faulty installation of the heating unit or from defective wiring in the building, from lack of merchantable qualities and reasonable fitness in the heating unit itself, or from other possible cause. The store lost its case and the judgment was affirmed on appeal.

Study of the evidence and opinion in this case strongly suggests that Budget Saving overlooked a bet—though we, of course, have the advantage of a hint in the appeals court's opinion, delivered when it was too late for the furniture people to act upon it. Budget Saving might well have claimed that Tempra Tuer was negligent in not making a careful inspection of the electric wiring throughout the building before proceeding with the installation of the heating unit. Quite conceivably, the additional strain put upon the wiring system by the operation of the heating unit may have caused the insulation to burn out and thus have set the building on fire. The heating firm in the case was fortunately spared possible allegations on this point.

The court of appeals called attention to another fact which should have put Tempra on guard, and might well have proved costly to him. From the spot where the heating unit was installed, no less than 28 ft of stove pipe led to the flue. So lengthy a pipe, in presumable contact with the dry woodwork of a confessedly old building, presented an additional hazard.

Contractor Should Exercise Extreme Caution

Numerous decisions in other cases exemplify the principle that extreme caution is called for respecting electric wiring on the part of contractors, subcontractors, building owners and others not always directly connected with the electrical industry. For example, a worker sued the owner of a building for damages by reason of bodily burns resulting from a short circuit while testing the fuse box. Wires had been substituted for fuses. The court held that the worker had a cause of action and that the jury should determine whether the owners participated in, or had *constructive knowledge* of, substitution of wires for fuses and were therefore negligent.

In another case, an iron pipe which one contracting party was lifting from a well at an industrial site came in contact with a high tension wire. Personal injury resulted. The court held that the negligence of the other party in failing to place the wire out of reach was for the jury to determine.

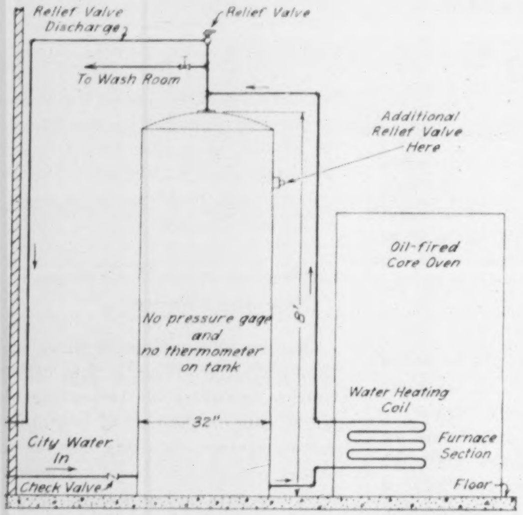
In yet another case, the broad dictum is laid down that it is within the province of the jury to determine the *extent* to which wires carrying "deadly electric current" should be insulated or otherwise guarded.

To point a moral, electric wiring seems to be viewed with definite solicitude by the courts, and whoever has anything to do with it, directly or indirectly, is left for the jury to dispose of. The heating, piping or air conditioning contractor, whose activities may well affect the building's electric wiring system, would seem to be particularly vulnerable.

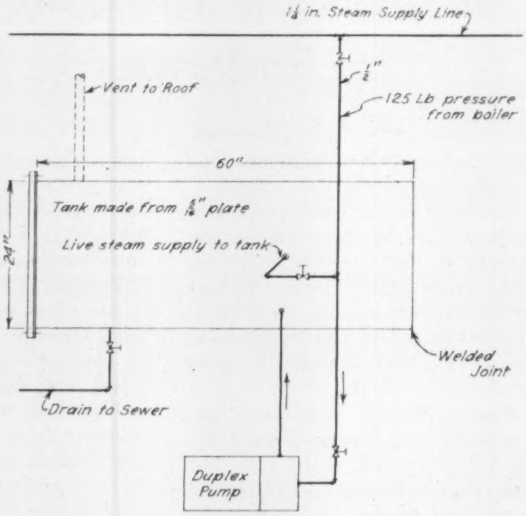
[Note: While this discussion applies to actual cases, it should be remembered that legal rules vary in different states.]

William Hurd Hillyer, author of this article, is a contributor to a number of banking and financial publications and has written several books on business. A former vice president of the Atlanta Trust Co., his work there gave him a practical legal background.

ANYTHING CAN HAPPEN


Relief Valve Discharge
Relief Valve
To Wash Room
Additional Relief Valve Here
Oil-fired Core Oven
No pressure gage and no thermometer on tank
8'
32"
Water Heating Coil
Furnace Section
City Water In
Check Valve
Floor

DANGEROUS METHOD OF heating hot water was used at a foundry, where a pipe coil was installed in an oil fired core oven. The author recommended the additional relief valve, installation of a pressure gage and thermometer, reducing coil surface if necessary


1¼ in. Steam Supply Line
½"
125 Lb pressure from boiler
Vent to Roof
60"
Tank made from 5/16" plate
Live steam supply to tank
24"
Welded Joint
Drain to Sewer
Duplex Pump

IT TAKES NO PROPHET to predict the outcome should the valve on the drain be closed while this tank was in service. The author recommended the atmospheric vent on the top, as shown by the dotted lines, and removal of the valve on the drain line

Piping Changes Improve Plant Efficiency, Safety

By C. T. Baker
Consulting Engineer

Consulting engineer's file provides case histories

• *Almost anything can happen when you're in the engineering or contracting (or sales) ends of the heating, piping and air conditioning industry. The objective of this more-or-less regular editorial feature in HPAC is to discuss the many practical problems that need solving — and the ways to solve them.*

WHILE EXAMINING recently some of my files marked "closed", I came across a number of case histories on subjects that I felt would be of interest to readers of Heating, Piping & Air Conditioning. In the brief resume of each case, the purpose is to point out that carelessness in attention to the details of plant management and false ideas as to economy are very often the causes of high operating costs and expensive shutdowns.

The Case of the "Faulty" Trap

A certain laundry and dry cleaning plant experienced considerable difficulty in heating a group of steam presses. In time, this resulted in a reduction in output and — naturally — complaints from customers about failure to deliver work when promised. Various excuses were offered as to the cause of the trouble. The plant mechanic claimed that the steam lines were too small, someone else argued that the boiler was too small, and a third man felt that the condensate return piping was too small and therefore, a vacuum pump should be installed.

My study of the situation disclosed that something vastly different was responsible for the trouble. In an attempt to hold down the first cost of the job, a single trap had been installed to drain the condensate from several pieces of equipment — no two of which had the same static head on the condensate due to variations in elevation of the presses.

Since a trap of the correct type and capacity was placed on each press, there has been no further difficulty in heating the presses and keeping deliveries up-to-date. The hot condensate from these traps was recovered for boiler feed.

In the same plant, steam used in the gasoline still was piped from the boiler (some 80 ft away) through a 1½ in. line, the greater part of which was outdoors. Since the pipe was uninsulated, the condensation rate in the line was very high and all condensate was dumped into the sewer.

To eliminate this unnecessary waste, a steam trap was installed to replace the hand valve which regulated the drainage of condensate from the line, and the hot condensate was returned to the feedwater heater and thence to the boiler. This improvement reduced the cost of city water by an amount corresponding to the cost of the water which had formerly been wasted.

The rug drying room, fitted with several hundred feet of 1¼ in. pipe coil, also dumped its condensate to the sewer. Here again, there was no trap. To eliminate the waste of fuel and city water and, at the same time, to do a better job of drying, a trap was placed on the condensate outlet of the coil and the hot condensate was returned to the feedwater heater.

Not Long for This World

It was alarming to discover, in a small industrial plant, that a number of cast iron radiators designed for a safe working pressure of 15 lb per sq in. were using steam direct from the boiler at 100 lb pressure.

This very serious hazard was removed by the installation of a pressure reducing valve, set to reduce pressure to 16 lb. As a further precaution, in case of failure of the reducing valve, a safety valve of ample capacity was provided on its downstream side.

In a small textile mill, a steam boiler carrying 125 lb pressure was equipped with a 2½ in. blowoff pipe of standard full weight. Fittings used were of standard 125 lb rating and the single blowoff valve was an ordinary 125 lb globe.

When the boiler was blown down, all water and resulting flash steam was liberated into a very short space between the end of the boiler brickwork and the wall of the building. The fireman who performed the blowdown operation was forced either to remain in this small space and wait for its completion or to retreat to a safer spot and return to shut off the valve when he considered that sufficient water had been blown out.

No, the owners did not carry boiler insurance!

The Case of the False Water Level

The motor on a fan supplying primary air to a 125 lb, 60 in. by 16 ft HRT boiler burned out and was sent to a neighboring town, where there were facilities for making the necessary repairs. To tide the plant over during the several days required by the electric shop to rewind the motor, a steam jet was used to provide combustion air to the furnace. Except for one thing, this method of improvising would have been all right.

But the steam supply was taken from the steam connection at the top of the water column. As a consequence, with the steam control valve on the jet open, the gage glass on the water column indicated nearly three gages of water. When I asked the fireman to close the jet control valve to see what would happen, water in the glass dropped nearly to the top of the bottom packing gland, indicating less than half a gage. Although the plant manager would have preferred correcting the mistake over the weekend, he was quite willing to accept my advice without delay when I told him that he stood a good chaace of losing several tubes if he waited.

The Case of the Missing Soap

An industrial plant that operated five days a week was closed down from 4 p.m. on Friday until 8 a.m. the following Monday. On one weekend, the man who had the job of cooking soap in a steam kettle failed to close the valve on the ¾ in. steam line to it. Pressure dropped and a partial vacuum was created in the steam supply line to the kettle.

As there was no check valve on the line to prevent back flow, the entire content of the kettle was siphoned into the piping system. By chance, the situation was discovered and, fortunately, the operators were able to clean out the pipes before the boiler was placed in service.

What Price Safety and Hot Water?

The manager of a foundry hit on what he considered a splendid plan for obtaining a continuous supply of hot water.

A 32 in. diameter by 8 ft high tank was installed close to an oil fired core oven. A pipe coil was placed in the furnace and so arranged as to expose practically all of its effective area to the heat of the furnace. This coil was connected to the water storage tank, as shown in the accompanying sketch — which also exhibits other features of this "latest gift to mankind."

The system operated without benefit of pressure gage or thermometer. There was of course no means provided for limiting the temperature to which the water could be heated. Employees using hot water from this system complained of dangers that could easily stem from large volumes of flash steam.

No one knew at what pressure the relief valve would open, if at all. A check valve on the city water line prevented hot water from backing into the city main. Note too the manner in which the safety valve was installed. Just what the resistance due to friction in the discharge line connected to the relief valve was could not be determined, for obvious reasons.

I recommended the installation of a relief valve at a point as indicated on the sketch. I also advised installation of a pressure gage and thermometer and, if necessary, reducing the coil heating surface.

Dangerous Space Heating Practice

I was engaged to investigate an industrial plant that reported many operating problems. Some of the difficulties had to do with the boiler plant, while others were to be found in the steam distribution system and in the compressed air system.

Electric current for power and lighting was supplied by the public utility company — which was rendering excellent service to all departments of the plant as a whole. Steam was supplied by two fire tube boilers, one rated at 125 hp and the other at 150 hp. The steam pressure carried was 125 lb gage. During all but the months in which space heating was required, the fuel consisted of sawdust, shavings and other waste materials.

As the investigation proceeded, many interesting facts concerning the prevailing operating methods and condition of the equipment came to light. One of the most interesting of all was the space heating practice.

Scattered throughout the sprawling building were a large number of cast iron radiators. There was absolutely nothing wrong with these radiators — they had been doing a good job of keeping the building warm. The criticism was not of these faithful heaters, but of the steam pressure delivered to them.

Cast iron radiators designed for a safe working pressure of 15 lb per sq in. were being supplied with steam at approximately 125 lb. This was the second case of such dangerous practice that I have recently discovered.

The remedy in this instance as in the other was a reducing valve to drop the pressure to around 15 lb and a safety valve to protect against overpressure in case of failure of the reducing valve to move toward the closing position when the steam demands of the radiators decreased.

The Case of the Unsafe Tank

Installed in one department of this same plant was a tank used for steaming the arms of a certain type of chair which was assembled in this department. It was called the "arms steaming tank". Ordinarily, sufficient steam for this tank came from a steam driven duplex pump that supplied hydrostatic pressure to a nearby hydraulic press.

The tank is 24 in. in diameter by 60 in. long and is supported by the ceiling rafters above. The shell and heads were made of 5/16 in. thick plate. The heads were flat and neither the heads nor the shell were braced in any manner. One head was hinged to provide an opening for filling and emptying the tank. When in the closed position, this head was held in place against a gasket by several bolts and nuts.

There was no vent to relieve excess pressure to the atmosphere should someone close a valve — which for some reason had been placed on the condensate outlet line connected to the bottom of the shell.

To supply steam to the tank when the pump was not in service, a live steam supply had been provided — as shown in the accompanying sketch, which also shows other details of the tank hookup.

It takes no prophet to predict the outcome should the valve on the drain line be closed while the tank was in service.

This death trap was eliminated by the removal of the valve on the drain line and by placing a 2 in. atmospheric vent on the shell at the top, as shown by the dotted lines. At no time was it ever necessary to put pressure on this tank.

Inquiry developed the fact that the end door of the tank had blown out some months previously as a result of the valve on the drain line having been closed by "a person or persons unknown". Fortunately, the attendant was some distance away at the time and was not injured.

City Water and Heat Wasted

A 12 in. by 13 in. single stage air compressor at this plant supplied compressed air at 100 lb pressure. The compressor and aftercooler received cooling water direct from the city mains at 45 lb pressure. Both the compressor jacket and aftercooler had a 1 in. supply line. The control valve on each was operated wide open. The runoff water was dumped into an underground cistern, from where it overflowed to the sewer.

Most of the hot condensate from the steam-using equipment (including the heating system for that area of the plant) was also dumped into the cistern and went to the sewer along with the city water. This wasteful condition was corrected by the installation of a cooling tower which reduced city water consumption to that required as make-up to replace evaporation and windage loss.

All of the hot condensate originating in this area was collected in a receiving tank and returned to the boiler room for boiler feed. This not only recovered waste heat but saved city water as well.

Flue Blowing Assembly Pays Off

Notwithstanding that considerable deposit was always present in the tubes of the HRT boiler that handled the load, except for a few weeks during the winter months, no effort had been made to correct this except an indifferent manual scraping once a week.

This was corrected by the installation of a flue blowing assembly that could be operated externally and without opening the flue doors.

Flues are blown with steam at full boiler pressure once each day, an operation that completely removes all deposits and leaves the tubes clean.

This pays off during the heating season by eliminating the use of expensive coal along with waste fuel to carry the load.

Boilers Cross-Connected in "Patch Quilt Pattern"

The two boilers were crossed connected in a "patch quilt pattern" which left much to be desired. When the steam from the two generators finally got together, the meeting place was a 4 in. diameter pipe.

High steam velocities in this makeshift header and in the reduced connections between header and boiler were the cause of excessive water carryover with the steam. This situation was cleared up by the installation of an 8 in. diameter steam header which tied the two boilers together with a full size pipe inlet connection between each boiler and the header. A separate steam valve at each outlet was included with the new header, in order that individual control of each supply would be possible.

A new steam driven boiler feed pump was installed to permit a complete overhauling of the one in use.

The exhaust steam from this pump was passed through a closed coil in the condensate receiving tank in the boiler room. This added several degrees of temperature to the feedwater before delivery to the boiler.

SAM LEWIS' PAGE

Conditioning Air for Process and Comfort in Meat Packing Plants

I AM CONTINUALLY reminded of the "great circle." The most ancient religions were influenced by it. Kipling's Kim especially emphasizes the circle in the lore of the Tibetan lama and his drawing of the wheel of life. The circle, of course, is eminent in navigation, so that the shortest way from New York to London is by curving around part of the globe instead of following the straight line that we used to think is the way the crow flies. Doubtless the migratory birds instinctively lay out a great circle course.

In heat engineering, too, we find examples. The downdraft grate for coal burning became popular, then died out, and after a while it was rediscovered. The underfeed stoker and the spreader stoker both have passed through "great circles."

Absorption refrigeration is another example. It appeared early in the Chicago meat packing industry, was made to work splendidly, but largely was superseded by reciprocating ammonia compressors which are so slow moving that they seem never to wear out. Now we find centrifugal compressors standing ready to replace the sliding piston machines, but observe imminent return of the absorption refrigeration cycle that has neither sliding nor whirling motion.

The Chicago packing houses do not smell of death or of rotting organic material. Sometimes we notice odors, but they are the wholesome aromas of cooking fats, and all food preparation in Chicago packing houses is in immaculately clean surroundings.

Since livestock must be well-fed, watered and sheltered, the packing houses must be near the stockyards and originally both were out in the country. The city, however, soon surrounded the stockyards because of the need for skilled labor and because the location was healthy — despite an occasional smell of farm or of cooking. It was necessary for each meat packer to maintain offices at his plant, not only to keep the books and make out payrolls but also to cope with the sale of many byproducts — such as the medicines, soap, leather, hair and bristles that attend the industry that "saves everything but its squeal."

SAMUEL R. LEWIS, consulting mechanical engineer and a member of HPAC's board of consulting and contributing editors, comments informally each month on practical heating, piping and air conditioning problems. Because Mr. Lewis has for many years done a great deal of engineering work for the Chicago packing houses — and because many of HPAC's readers will be attending the heating and ventilating exposition in Chicago this month — we asked him to write about some of his air conditioning activities for meat packers

To obtain and to hold the office employees the packers in self defense are compelled to provide well heated, well cooled and well lighted offices and to maintain superlatively well-operated restaurants. No better food is obtainable anywhere than is available at Swift's or Armour's or Wilson's. The earliest large office buildings in the yards in Chicago — and, indeed, in all large packing house cities — were equipped with mechanical ventilation and automatic temperature control. My experience in air conditioning grew along with many of these plants.

Early Applications of Refrigerated Cooling

Early applications of refrigerated cooling involved adding to the original systems — between the outside air intakes and the supply fans — sprays of water. The water was chilled, preferably by cascading down around brine-cooled baudelot coils and the air was then chilled by the water. The jets faced against the air current in order to achieve an intimate contact so as to cool the air below its dew point temperature. Control usually was established by bypassing part of the air around the sprays and by varying the proportions of the cold, saturated air with untreated, normal air. Removal of dust was attempted unsuccessfully by drawing the mixed air and water droplets between surfaces that interposed a washboard-like effect, so that the dust might slap against grooves in the eliminator plates and eventually be washed down into a sump below the plates.

Sheet metal exposed to the chemical influence of air and water is not always as durable as might be desired. Various metals were tried in the days before the newer alloys and materials now available, and few of them endured for long. This induced me to design a large air conditioning plant without any metal whatever in the airway casings and eliminators. I employed vertical ribbed glass plates each about 1/4 in. thick, the plates held at the top and bottom in grooves cut in treated cypress wood. The sharp edged glass grooves permitted the sprayed water to wash down the debris and the wood — constantly wetted — endured indefinitely.

Corrosion of some metal was so rapid and continuous service was so important that one packer insisted on keeping in storage a complete extra supply fan good for 100,000 cfm of air.

"Ancestor" of Many Modern Diffusers

The original refrigerated air systems usually employed the existing ducts and grilles and diffusers of the preceding ventilating system. These mostly were on inside walls or alongside columns and usually were about 8 ft from the floor. A stream of air at 60 deg introduced into a crowded and overwarm room, would fall like water from a hose on the bald heads of the older men and on the thinly clad shoulders of the women. The cool air then would cross the floor to the old exhaust grille in the wall and eventually that grille would be stopped up to prevent drafts around the ankles of the girls.

I tried many different schemes to introduce and to remove the air, and by cut and try experiments found acceptable results with a two-way home-made ceiling device that was the ancestor of many modern diffusers.

In the center of each bay of about 400 sq ft of floor, the entering air is sprayed out horizontally or at a slight downward angle, close to the ceiling. In the center of the fixture there is a grille through which the spent and warmer air may flow upward and escape. The result indicates excellent diffusion of the entering air and acceptable removal of the highest, warmest, air from its natural stratum. There is no evidence of any wasteful short-circuiting. There are hundreds of these combination diffusers in the packing house offices, built long before any of the diffuser manufacturers made them commercially available. The late Dr. Willis Carrier told me I should have patented the scheme, but I am not in the patent business.

Sausage Drying an Air Conditioning Problem

Sausages are very good eating — to people who like sausages. Many nationalities have home-land preferences for certain sausage flavors and components. Cold snacks are very much enlivened by slices of summer sausages. The packers make a great many kinds of wholesome, flavorsome sausage smoked and armored against flies, to the recipes of Croat and Serb and Italian and German tradition.

After being stuffed into the casing, the sausage is protected from the egg-laying flies until the casings become dry and impervious to contamination. Drying is accomplished by the aid of refrigerated air. During this process, the outsides of the casings develop a vegetable growth like green mold. Thousands of pieces of sausage hang on superimposed hooks in acres of sausage dry rooms. A force of men must be busy taking down the sausages to wipe off the mold and to let the dry refrigerated air get to work on the surface, unimpeded by the forest of plants that, like yeast, try to grow there. The sausages first touched by the entering cool dry air of course tend to become dry first and may be over-dry, while those more distant from the air inlets will respond more slowly.

I arranged a sausage dry room in one of the Chicago plants with overhead ducts, rather closely spaced, to deliver the air through continuous slots toward and around the hanging sausages. Duplicate ducts at the floor paralleled the overhead ducts. One day (or part of a day) the dry air was delivered at the ceiling and moist air departed at the floor. A clock would flip a time switch and would reverse the direction of the air for another cycle so as to allow the air to enter at the floor and depart at the ceiling. Due to this change, the sausage in the whole room could be dried much more uniformly and acceptably.

Too rapid drying of the casing was reduced near to the air supply inlets, and the sausages near the outlets were adequately treated. The cost of labor to take down, wash and wipe off the mold and rehang the sausage loops was greatly reduced. The air was recirculated back to the chilled water sprays of the refrigerating plant and a continuous stream of water spilled over from the tank there, this being the dehumidification water that had been evaporated from the sausage.

ACRMA GIVES SALES FIGURES ON ROOM CONDITIONERS

The Air Conditioning and Refrigerating Machinery Association recently released its estimates of manufacturers' shipments and distributors' sales in the year 1952.

These estimates for 1952, given here, include shipments by all manufacturers, both ACRMA member-companies and non-members. The figures for 1951 are manufacturers' shipments as reported to the Bureau of the Census.

Based on a comparison of manufacturer and distributor inventories at the beginning of 1952 and inventories near the close of the year, 412,000 room air conditioning units are estimated to have moved into dealer hands during the year, according to the ACRMA. The 412,000 unit figure is believed to at least approximate the actual sales of room air conditioners to users during 1952. Dealer stocks at the end of the year were known to be substantially less than in January 1952.

ROOM CONDITIONER manufacturers' sales for 1951 and 1952

Room Air Conditioners	Units		Manufacturers' sales value	
	1952	1951	1952	1951
Windowsill type	330,770	228,964	$61,755,000	$42,442,000
Console (floor) type	10,230	8,526	4,425,000	3,382,000
Total	341,000	237,490	$66,180,000	$45,824,000

QUESTION OF THE MONTH

Trouble on Cooling Job

Here's a question from a reader on a trouble job, followed by suggestions from several authorities for correcting it. Additional comment from others for publication in these pages will be welcomed.

"We have recently had brought to our attention trouble on a theater air conditioning installation which is quite unusual in our experience, and we would appreciate any thoughts or help that could be given us.

"The theater is cooled by a 40 hp hermetic condensing unit and a set of precooling coils which are supplied from local wells, the water first going through the pre-cooling coils, and then through the water cooled condenser. The well water temperature is 56 to 58 F, and is pumped through the condenser at the rate of approximately 37 gpm.

"The water from this well is understood to contain a peculiar type of bacteria known as crenothrix, which, apparently when exposed to the oxygen released from the well pumping, die and precipitate in the form of rust or iron oxide, mainly on the condenser tube surface. This condition is so severe that it plugs the condenser finally, and presents a serious service problem."

From the information given, I would suggest that chlorination or the use of a hypochlorite is the best bet in dealing with the iron bacteria known as crenothrix. It is possible that a copper salt such as copper sulfate may be of some benefit but we believe that chlorine or a chlorine bearing compound will be better—John B. Davis, Chemical Sales, Water Conditioning Section, Mechanical Power Dept., Allis-Chalmers Mfg. Co.

Crenothrix is a filamentous bacterial growth which lives on the iron in the water and the deposits found in the condenser tubes are from the bacterial growth. Treatment with chlorine or chlorine containing compounds will prevent this growth. Continuous treatment with up to 5 ppm of chlorine and occasional heavier doses should eliminate it.

If this is a private well used principally for the condensers, it may be possible to arrange a drip chemical feed into the well. Otherwise, some arrangement must be made to add the chlorine to the water line at the earliest possible point after it leaves the well.—E. M. Partridge, Manager, Chemical Service Div., The Permutit Co.

The problem of crenothrix or other iron bacteria in well water supplies is an aggravating one to the user of the water. On large wells with high pumping rates, the size of the installation usually justifies the cost of installing continuous chlorination equipment and making provision for continuous feed of polyphosphate. This combination of chlorine and polyphosphate controls the situation very nicely to the extent that the slimy deposits are no longer experienced.

On relatively small installations, where the pumping rate of the well is less than 50 gpm, it is still possible to arrive at an economical solution to this problem by installation of hypochlorite feed along with the feed of polyphosphate. A number of chemical pump manufacturers provide pumps suitable for this purpose. A double-head pump may be used to inject polyphosphate solution from one chemical vat and hypochlorite solution from another chemical vat continuously into the well water, the electrical circuit of the chemical pump being tied in with that of the well pump so that the chemicals are fed whenever the well is being pumped.

An additional measure which may be of considerable benefit would be the intermittent application of hypochlorite directly to the well for sterilization purposes.—R. S. Wise, Director, Technical Service, Cooling Water Div., National Aluminate Corp.

The water analysis is not given. This is regrettable, for the iron content of the water is of importance.

Crenothrix algae or bacteria live only in the absence of oxygen and die when the water is aerated or chlorinated. One way to kill them is to pump a little HTH calcium hypochloride into the well. A preferred food of the algae are dissolved iron compounds. In the digestion of it the iron is precipitated in the algae bodies and turns them brown. The algae, including brown iron oxide, are well removed by passing the water through a filter of sand or anthrafilt. An added safeguard against deposits would be to feed to the filter effluent 1 or 2 ppm HTH and 3-4 ppm sodium meta phosphate. The sodium meta phosphate will keep in solution any bit of iron which may have passed the filter and further reduce substantially the corrosion of the condenser. The chlorine from the HTH will keep down the deposits of organic slime. —P. C. Goetz, Chemical Director, Refinite Corp.

READER WOULD LIKE COST DATA ON SIDEWALK SNOW MELTING

If you don't have the answer to a problem, chances are someone else does — or can be helpful on part of it. That's the purpose of HPAC's Question of the Month "idea exchange," where questions on heating, piping and air conditioning are asked and answered.

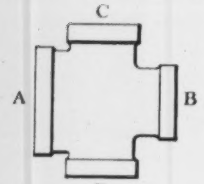
You are invited to contribute a question for publication, or an answer to a published question. . . . Please address your reply to the Editors, Heating, Piping & Air Conditioning, 6 N. Michigan Ave., Chicago 2.

"I am most interested in obtaining any data available on the cost of installing and operating sidewalk snow melting coils. We are giving preliminary consideration to snow melting for the sidewalks on two sides of our office building.

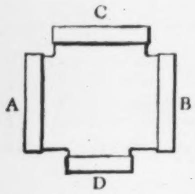
"If available, I'd like to get some figures on costs using water or an antifreeze compound circulated in pipe coils embedded in the concrete, as well as by electrically heating the sidewalk."

DATA SHEET

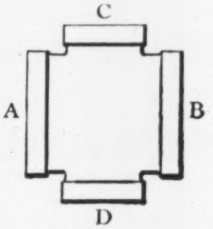
Crosses



Cross
Reducing on one end of
Run and on both Outlets

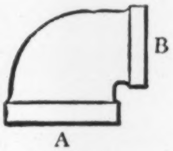


Cross
Reducing on
one Outlet only

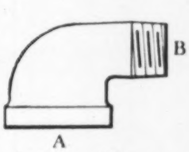


Cross
Reducing on
both Outlets

Elbows

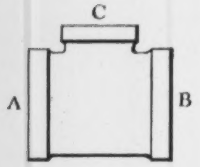


90° Elbow
Reducing

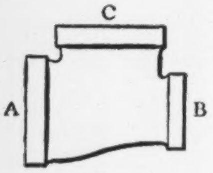


90° Street Elbow
Reducing on male end

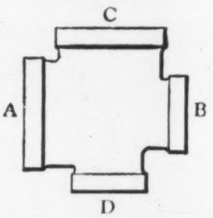
Tees



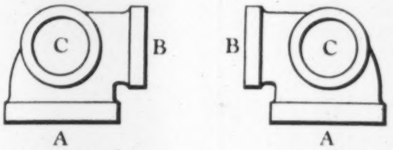
Tee
With Outlet
reduced



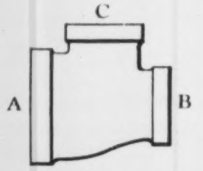
Tee
With one end
of Run reduced



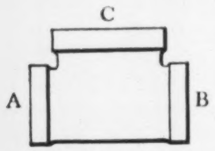
Cross
Reducing on one end of
Run and on one Outlet



Right Hand
Left Hand
Side Outlet 90° Elbows
Reducing on two Outlets

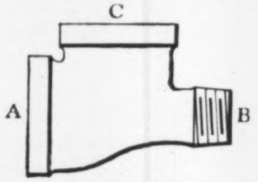


Tee
With one end of Run
and Outlet reduced

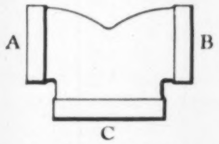


Tee
Bull head type—Both
ends of Run reduced

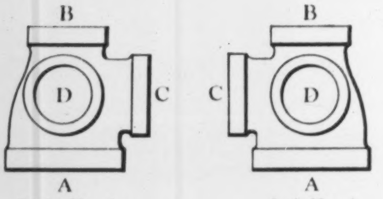
Service Tee



Service Tee
Reducing on male end
only

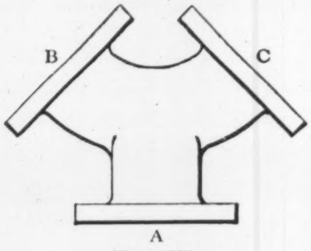


Double Branch Elbow
Reducing on both ends of Run



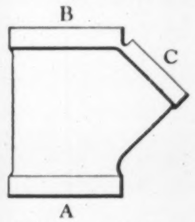
Right Hand
Left Hand
Side Outlet Tees
With one end of Run and Outlets reduced

True "Y"



True "Y"

45° Y-Bend



45° Y-Bend (Lateral)
Reducing on Outlet only

How To Read Reducing Fittings

To ASSIST THE user in "reading" reducing fittings, a variety of types commonly required for piping systems are illustrated. In these sketches, each opening of the fitting is identified with a letter which indicates the sequence to be followed in reading the size of the fitting.

In designating the outlets of reducing fittings, the openings should be read in the order indicated by the sequence of the letters "A," "B," "C," and "D." On side outlet reducing fittings, the size of the side outlet is named last.

A cross having one end of the run and one outlet reduced is designated as 2½(A) x 1¼(B) x 2½(C) x 1½(D), simply by naming the largest opening first and then naming the other end of the run, and then the two side outlets.

Although all but one of the illustrations are of screwed fittings, the same rules apply to the "reading" of reducing flanged fittings.

Courtesy Crane Co.

Room Units, Automobile Conditioning

By H. J. Prebensen

President, Air Comfort Corp.

. . . . are discussed in detail at two sessions during the annual meeting of the American Society of Refrigerating Engineers

A CONFERENCE ON room air conditioners and a session on automobile air conditioning featured the 48th annual meeting of the American Society of Refrigerating Engineers, held in New York City last month. Over 840 members and guests were registered at this principal meeting of the society. The attendance at the technical sessions indicated a strong preference for the conference-type of meeting.

Paul B. Moore presided at the room air conditioner conference.

Planning and Developing New Products

Lauren F. Jones, of RCA Victor, presented a comprehensive paper on general product planning. Although he professed but modest knowledge of the room air conditioner industry, he was of the opinion that product planning of any and all products of industry is similar in most aspects. Several important steps in product planning are of great importance, Mr. Jones said, among these being:

1) Obtain new ideas. This is the least costly step in the process. New ideas are created by research people, by personnel of the sales department and by outside services.

2) Determine what the buyers actually need. The engineer can easily accomplish the need of the buyer. The engineer, however, must recognize the technical feasibility of the idea.

3) Investigation and evaluation of new ideas. Here Mr. Jones gave credit to the "depth" interview technique instead of a wide poll to obtain prospective customer opinion. In this method few people are contacted but the idea interview is deeper and more exhaustive.

4) Develop the product. Mr. Jones pointed out that there is always some difficulty in arriving at an appropriation for new product development.

C. A. Peterson, a design consultant, presented the style aspect of product planning, calling his subject visional engineering of room air conditioners. He characterized the industrial designer as being part engineer and part artist who appreciates colors, line and form. He indicated that the visual aspect of a product is one that pays off at the retail level.

The product passes through many phases from the development stage to the consumer. Mr. Peterson pointed out that the ultimate buyer of a product takes much of the engineer's work for granted, is influenced by price but probably most by appearance, and that the objective of the stylist is to make the product sell better or more easily.

The product engineer and the visual engineer should collaborate during the design phase of a product if the best is to be accomplished. If the visual engineer is to do his job well, he must know colors and finishes, manufacturing processes for external casings in metals or plastics. Appearance of the external casing of any product must meet the functions of the unit, Mr. Peterson said. He emphasized that ease of installation was a consideration of the stylist and that the finished effect should be quiet and in good taste.

Special Features of Room Units

W. L. McGrath, Carrier Corp., covered the special features of room air conditioners. He said that special features are incorporated in a room air conditioner in order to:

1) Increase sales by broadening the market.

2) Extend usefulness.

3) Improve performance, and

4) Reduce the amount of human attention required.

These special features of room air conditioners include, he said, such things as

1) *Ventilation feature.* This permits the unit to double as a ventilator unit and permits cooling in the fall and spring without the use of refrigeration, also clearing away smoke.

2) *Exhaust feature.* This is of only modest value unless a room air conditioner is arranged to perform this function against adverse wind or stack effect.

3) *Heating feature.* This was started many years ago, then dropped, and is now back again. Strip heaters, if employed, should be of less wattage than the compressor motor. Some units use the reverse cycle.

4) *Humidification.* The industry has largely abandoned humidification in room air conditioners because of maintenance problems.

5) *Filters.* Room air conditioner filters have low efficiency on standard dust, but do a generally satisfactory dust and pollen removal job in normal service. The wetted surface of the evaporator coil is a good filter, he said.

6) *Temperature control.* This seems desirable when the unit is used in bedrooms but not absolutely necessary for other uses. In some areas, restrictions of the power companies prevent the use of thermostats. Temperature control is provided in room air conditioners by such devices as thermostats, losing methods, reduction of evaporator capacity, reduction of fan speed, and use of multiple compressors.

7) *Time-Clocks.* These devices are useful in offices to establish precooling.

8) *Deodorizing.* This can be accomplished with masking odors, activated carbon, ozone, and organic deodorizers. All of these are difficult to apply to room air conditioners. Mr. McGrath pointed out that the room air conditioner in itself is a reasonably good deodorizer because compounds causing odor condense out on the evaporator coil and are trapped in the condensate.

9) *Sterilization.* Mr. McGrath indicated that the industry has given little consideration to lamp sterilization because of space limitations or to ethylene glycol because of its impracticability in a unit.

10) *Application versatility.* Mr. McGrath said that versatility of installation of room air conditioners broadens the scope of their usage.

M. A. Clark, of York Corp., discussed design considerations of room air conditioners. He said that any considerations of design must respect design standards and industry standards. The starting points of design, he said, include:

1) Capacity at design conditions.
2) Maximum loading condition.
3) Minimum loading and minimum temperature conditions.
4) Underwriters' Laboratory requirements.
5) Condensate elimination.
6) Current inrush.
7) Vibration and noises.
8) Rain test.
9) Manufacturing standards and quality control.
10) ASRE Proposed Standard 16R.
11) Attractiveness.
12) Lot cost.

What Utilities Think of Room Conditioners

J. R. Hartman presented the utilities' viewpoint of room air conditioners. He said that utilities were generally concerned about the starting current of room air conditioners and pointed out that starting and stopping of such units affects voltage regulation. The Edison Electric Institute is currently studying room air conditioner applications and their effect on system load factors. Load studies in two cities indicate that the load factor for room air conditioners varies from 5 to 23 percent.

Mr. Hartman said that the utility feels that when it has a load factor for residential areas of 33 percent it is considered good practice. The load factor on a system affects the cost of supplying electric service to the consumer. He stressed the fact in general that utilities liked the room air conditioner employing the reverse cycle because it increased the load factor.

C. C. Fitzsimmons, of the Underwriters' Laboratories, pointed out the dangers in using room units of over ½ hp on 115 volt supplies, and reviewed the U. L.'s new air conditioner standards.

Several Experts Discuss Automobile Conditioning

J. R. Hornaday presided at the Symposium on automobile air conditioning, which was participated in by J. W. Duhn, Chrysler Corp., O. G. Tinkey, Anchor-Temp Co., H. Schjolin, GMC Truck and Coach Div., General Motors Corp., A. A. Kucher, Ford Motor Co., and S. Landell, GM Oldsmobile Div.

Mr. Duhn pointed out the following problems which pertain to automobile air conditioning:

1) Compressor should have sufficient capacity at low road speeds and still have stamina to stand high speed driving.
2) Logical place for compressor is in the engine compartment. This complicates an already crowded location.
3) Location of condenser in front of radiator affects car cooling.

He indicated the Chrysler design contemplated a system to handle 400 cfm which indicates a quick air change in a car having about 125 cu ft of space. This helps reduce cool-down period which Chrysler feels should not be over 2 min. They feel that the capacity range should be 1¼ to 1½ tons at 25 mph.

Mr. Tinkey traced the application of air conditioning to passenger cars.

Mr. Schjolin discussed the application of air conditioning to busses, which started in 1934. He pointed out that in 1939 when bus engines were moved to the rear of the vehicle there was, for the first time, sufficient room to accommodate air conditioning equipment. He said that in a typical 41 passenger bus, 600 cfm is used for cooling and 1200 cfm for heating. Condenser air requirements are approximately 6500 cfm. A separate engine is directly connected to a compressor having a capacity of approximately 4½ tons, the engine speed being varied to control capacity of the system. He pointed out that problems in bus air conditioning involve:

1) Reduced weight — a very important consideration.
2) They would like to abandon the separate engine driving the compressor, admit no solution, but do like the flexibility of a separate drive.
3) Desire to move equipment location to roof of bus.

Mr. Kucher discussed the Ford Motor Co.'s approach to air conditioning of passenger cars. He indicated an ever increasing demand for car cooling. The conventional system with a compressor mounted in the engine compartment disturbs the weight distribution characteristics of the car. He said that a package type of unit would be preferred because it would permit installation in the field. He indicated that the future may possibly provide a power take-off from the engine to generate electrical energy at high frequency in order to reduce weight. He also said that some study had been made of the application of absorption refrigeration which indicated disadvantages of high pressures, larger condensers and inadequate exhaust heating availability at low speeds. Mr. Kucher also said that the air expansion method has been investigated but that a power requirement of 8 to 9 hp to produce 1½ tons was considered too high. An inside temperature of 72 when it is 90 outside and similarly 78 at 110 F outside was considered a satisfactory design basis.

Mr. Landell presented the details of the factory installed air conditioning on the 1953 Oldsmobile. He said that design considerations of capacity were affected by the fact that the interior volume of the car is about 110 cu ft, that external surfaces are subject to high outside temperatures, that car occupants all add heat and that heat from the dashboard is significant.

The Oldsmobile system consists of a rotary type belt driven compressor weighing about 51½ lb and producing about 2 tons at 50 mph. Air quantity is 300 cfm and two outside air scoops pick up about 60 cfm each at 50 mph. Distribution ducts run along the roof of the car at each side which is perforated and also has two directional type outlets in each duct. Temperature control is accomplished by means of a bypass valve. It is interesting to note that the manufacturer recommends the use of a windshield visor on all air conditioned models. Following are Oldsmobile performance figures:

Outside air temperature	Inside air temperature	Delivered air temperature
78°	69°	57°
104°	72°	49°

Relative humidity varies from 25 to 55 percent

The total weight of the air conditioning equipment on the Oldsmobile is approximately 285 lb.

The cost of air conditioning for passenger automobiles was reported at the conference to vary from $500 to $740 but no 1953 prices have been released as yet.

Prof. Richard C. Jordan, of the University of Minnesota, was elected ASRE president, and Arthur J. Hess, of Hess-Greiner & Polland, Los Angeles, and Leon Buehler, Jr., of the Creamery Package Mfg. Co., Chicago, were named vice presidents. C. M. Ashley, Carrier Corp., Syracuse, N. Y., is the new treasurer.

Heating, Piping & Air Conditioning

THE AMERICAN SOCIETY OF HEATING
AND VENTILATING ENGINEERS

JOURNAL *SECTION*

Air Velocities in Ventilating Jets

By G. L. Tuve*, Cleveland, Ohio

This paper is the result of research sponsored by THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS in cooperation with Case Institute of Technology

SUMMARY — Starting with a technical description of a free air stream, and of annular jets in particular, the methods for analyzing jet performance are reviewed. Findings of various investigators support the proposed methods for determining: (1) the velocity patterns along the jet axis, (2) the velocity profile at any cross section in the fully turbulent zone, and (3) the angle of divergence. Experimental data are given for both axial and radial annular jets, and for air streams flowing along a wall.

THE ENGINEER needs the answers to a few simple questions about a jet discharged from any air supply outlet. In general terms, the most common questions are:

1. How far does the jet travel or what is the throw?
2. What is the shape of its spread or coverage?
3. How can the velocity at any selected point within the jet be determined?

It is admitted by the engineer that although he wants simple answers, the safest way to insure accuracy of these answers is to build up as complete an understanding as possible of the behavior of all jets, based on theory as well as experiment. Both engineers and scientists have paid much attention to the problem of the free jet in the past 20 years, and at least 50 papers have been published. Most of the papers of high theoretical excellence are unfortunately deficient in the supporting experimental work necessary to determine the constants in the equations. Conversely, the experimentalists have not paid enough attention to theoretical analysis. After making a critical summary of more than 175 references on the subject, Nottage concluded, *the ventilation jet problem in air distribution appears to have attained a stage where careful experimentation and semi-empirical theories can be made highly productive of design data.*[1]

It is the aim of the author of this paper to select some of the promising semi-empirical theories, and to support them by experimental evidence. Special attention is given to annular jets.

Defining a *free jet* as one that is discharged into a relatively large room or other free atmospheric space, the limitations are imposed that no surfaces or objects are near enough to the stream to interfere with the formation of the natural flow-pattern and that the primary stream is straight-flowing and is free from pulsations and helical flow. Isothermal jets will first be considered, but modifications to account for the nonisothermal conditions usually encountered are not so great as might be expected.

Two classes or groups of practical devices are included in the overall study:

Class 1. Straight-flow devices; nozzles, orifices, slots, perforated panels, straight-flow grilles and registers and multiple openings located close together.

Class 2. Annular outlets without diffusers, (including ceiling plaques).

Types of Annular Jets

Annular openings may be arranged to produce straight-flow axial jets or pure radial jets. Four basic types of annular outlets are shown in Fig. 1. Outlet A is a circular slot in a wall or ceiling, discharging perpendicular to the same, and is formed by a round nozzle with a solid core in the center. Outlet B represents the other extreme, in which the jet is directed radially from the axis of the approach duct. This form amounts to a leakage ring between two identical ducts placed end to end. Outlet C, usually called a ceiling plaque, is a

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*Professor of Mechanical Engineering, Case Institute of Technology. Member of ASHVE.
For presentation at the 59th Annual Meeting of THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, Chicago, January 1953.

[1] Exponent numerals refer to References.

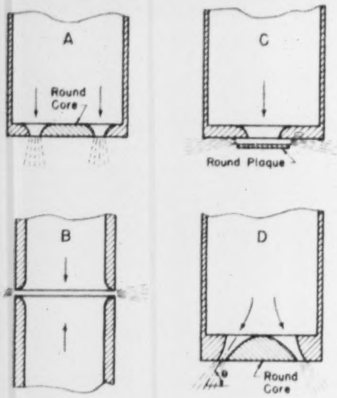


Fig. 1—Cross-sections of round ducts with four basic types of annular outlets

radial outlet with a plane boundary extending from one edge. It might be considered the limiting condition of outlet B as the radial jet is brought close to a wall or ceiling, or it may be considered equivalent to one-half of outlet B when the jet of the latter is bisected by a radial plane. Outlet D is the case between A and B, and may approach one or the other, depending on the Angle Θ.

There are in practice many variations of these fundamental forms, depending on the nature of the approach to the outlet, the shape and dimensions of the outlet and plaque, and the presence of guiding vanes or surfaces. One of the variations of outlet D, not being considered here, is the addition of an annular diffuser or expanding nozzle. Another whole family of devices is produced by using square or rectangular forms instead of circular.

Four Zones In a Jet

When the several portions of a free air stream leave the outlet face in straight parallel flow, a surprising similarity has been found at a distance from the outlet, whether the latter is round, rectangular, grille-like or a perforated panel. Even with wide-angle grilles or annular outlets the similarities admit the use of the same type of appraisal and analysis.

Four major *zones* are recognized along the direction of flow of a free jet. These zones may be roughly defined in terms of the maximum or center-core velocity that exists at the cross-section being considered:

Zone 1: A short zone, of 2 to 6 *diameters* from the outlet face (The distance from the outlet discharge face is for convenience expressed in *diameters.* For all axial-flow outlets, this is the diameter of an equivalent round nozzle of the same total gross area.) The maximum or *core* velocity is very nearly equal to the original outlet velocity throughout this length.

Zone 2: A transition zone that usually extends to 8 or 10 *diameters.* Over a fair portion of this zone, the maximum velocity may vary inversely as the square root of the distance from the outlet. For a rectangular outlet of large aspect ratio this zone is elongated.

Zone 3: An extensive zone and one in which the maximum velocity varies inversely as the distance from the outlet. This zone is from 25 to 100 *diameters* long, depending on the shape and area of outlet and the initial velocity. This is often called the zone of fully established turbulence or the principal zone of the jet.

Zone 4: A terminal zone in which the residual velocity decays rapidly into a large-scale turbulence. Within a few diameters the maximum velocity subsides to the range below 50 fpm usually regarded as *still air.*

For the application of air supply jets to ventilation and air conditioning the important part of the jet is Zone 3, in which the center velocity varies inversely as the distance from the outlet. In Zones 1 and 2 of a jet from a rectangular outlet there is a transition to circular or elliptical cross-section. For axial-flow multiple or annular outlets the streams merge in Zones 1 and 2, but again in Zone 3 only the typical conical or elliptical stream is recognized. In Zones 1 and 2 the measurement and accurate description of the stream may be difficult, due to rapid transitions, merging of jets, pressure variations and the small distances involved. In Zone 3, however, the cross-sectional velocity pattern or profile observed radially from any point along the center line of the jet resembles a typical *probability curve.*

Analytical Approach

A full analysis of the performance of a free jet not only involves the four *zones* already indicated, but should also be applicable to any one of the air-outlet combinations that are available to the engineer for air distribution in a space. In classifying air outlets the shape and size of openings is the first consideration, but the *approach history* of the air stream must also be considered. The patterns of velocity, direction, pressure and turbulence existing in the stream prior to or at the exit from the outlet face will have their effect downstream. The presence of guiding surfaces or vanes at or near the outlet, and the proximity of multiple jets must be taken into account.

Laws of continuity, conservation of momentum and conservation of energy, and also the Prandtl mixing length theory, have been applied to the analysis of free jets. Dimensional analysis and similarity have been useful tools. The vorticity transfer theory has been developed in a like manner to the momentum transfer theory. These have also been correlated with heat transfer and with mass transfer (diffusion by using heated or cooled air and introducing various diffusing gases). Some of these approaches have leaned heavily on the theories of turbulence. But turbulence is a most complex phenomenon and even when the concepts regarding it can be expressed mathematically, the means of measuring the quantities experimentally are deficient. All of the mathematical formulations defining jet performance call for experimental constants, and in many cases these are not as yet well established.

Analysis and experimentation are continuing, and the usefulness of each of the several theories is being explored by various investigators in this country and abroad. In the meantime would it be possible to combine the results of existing jet investigations into practical engineering methods for answering such questions as those stated in the first paragraph of this paper?

It appears that an engineering analysis, applied to the *Zone 3* only, may be based on the assumption that the useful energy in a jet is represented by the velocities parallel to the jet axis. If these velocities can be determined with acceptable accuracy throughout the third zone the engineering problem may be solved. Other forms of energy in the jet are considered as *losses* and are taken into account only by empirical coefficients. For simplicity, the air is treated as an incompressible fluid and it is assumed that viscous flow is not encountered in Zone 3. These assumptions are usually within the limits of engineering accuracy.

Omission of Zones 1, 2 and 4 of the jet is justified both on the basis that data on these zones are of much less importance to the ventilating engineer and that the methods of measurement in these zones are as yet too involved and too tedious to be practical either in the engineering laboratory or in the field. A major difficulty in Zones 1 and 2 is the existence of static pressures either above or below atmospheric pressure.

Determining the Centerline Velocity — Axial Jets

The two chief characteristics of Zone 3 of *established turbulent flow* are (1) maximum axial or centerline velocity is inversely proportional to the axial distance, (2) cross-stream velocity profiles are similar. A third characteristic of importance in non-isothermal jets is the similarity of temperature profiles.

Three common types of outlets will be considered.

Type 1 — Round Outlets: More experiments have been made with round outlets than with any other kind, and the analytical treatment of the round jet is also the most satisfactory. The simple momentum transfer theory, (conservation of momentum), indicates that the relationship between the centerline velocity V_c and the distance X from the point source should be: V_cX = a constant.

This *Zone 2 hyperbola* has also been recognized by most experimentalists, and has been verified by the fact that as V_c decreases with the distance from the outlet, experimental points form a straight-line at 45 deg on logarithmic coordinates. Examination of data reported by many investigators in this country and abroad shows that when non-dimensional logarithmic scales are used, even if the X-distance is measured from the discharge face, (rather than from an imaginary point source reported at about $-2.8D$ by Nottage[1], located it at about $-2.3D$ for round nozzles by Ribner[2], and reported it at $-2.0D$ by Schmidt[3]), a 45 deg straight line fits the experimental points over a wide range, with range, with good engineering accuracy. (To confirm these statements, data on round outlets are summarized in Table A-1 in the Appendix). The proportionality constant designated as K or K' is defined by the common equation (see also THE GUIDE 1952, p. 650):

$$\frac{V_c}{V_o} = \frac{K'\sqrt{\frac{\pi}{4}D^2 x C_d x R_{FA}}}{X} \quad \text{..............} (1)$$

which may be written

$$\frac{V_c}{V_o\sqrt{C_d R_{FA}}} = K'\frac{\sqrt{A}}{X} \quad \text{..............} (1a)$$

or

$$\frac{V_c}{V_o\sqrt{C_d R_{FA}}} = K\frac{D}{X} \quad \text{..............} (1b)$$

where

V_o = outlet velocity (at vena contracta), feet per minute.

V_c = centerline velocity in the free jet, feet per minute.

X = distance from outlet face, feet.

A = measured gross (core) area, square feet.

D = diameter of a circle equal to the gross area, feet.

C_d = coefficient of discharge of outlet, (usually between 0.65 and 0.90).

R_{FA} = proportion of free area to gross area, decimal.

K and K' = proportionality constant. In several previous papers, instead of using D, the equivalent diameter, $(A)^{1/2}$ has been used. Resulting values of K' would then be larger by a factor of $(4/\pi)^{1/2}$. Since rectangular streams tend to assume a circular shape in the third zone, the equivalent diameter furnishes a more logical unit in which to measure the distance X for free openings, but $(A)^{1/2}$ is more convenient for multiple openings, (where $A \times R_{FA}$ is the free area in square feet.)

The limitations of Equations 1*a* or 1*b* have been fairly well indicated in reports already published. (For examples, see Appendix Table A-1.) Tests have been reported on outlet diameters from 0.25 in. to 12 in. and the outlet velocities were usually within the range 1000 to 10,000 fpm. For these ranges, Equation 1 apparently holds from about $X = 8D$ out to the point where V_c is of the order of 100 to 200 fpm.

It is generally accepted that the momentum or axial impulse force at the beginning of Zone 3 is less than that computed for the outlet face. It has also been demonstrated that Equation 1 holds even after the measured total momentum of the jet has been further reduced. A partial explanation may be that the core of the jet is not as readily affected by external conditions that cause loss of momentum near the perimeter. This zone of decreasing momentum involves a reduction in the rate of divergence of the jet.

Table 1—Recommended Values of the Centerline Velocity Constant K or K' (See Equation 1)

Type of Outlet	K		K'	
	V_o = 500 to 1000	V_o = 2000 to 10,000	V_o = 500 to 1000	V_o = 2000 to 10,000
Free Openings				
Round or Square	5.0	6.2	5.7	7.0
Rectangular, large aspect ratio (<40)	4.3	5.3	4.9	6.0
Annular slots axial or radial[a]	—	—	3.9	4.8
Grilles and Grids				
Free area 40 percent or more	4.1	5.0	4.7	5.7
Perforated Panels				
Free area 3 to 5 percent	2.7	3.3	3.0	3.7
Free area 10 to 20 percent	3.5	4.3	4.0	4.9

[a] For radial slots use X/H instead of $X/(A)^{1/2}$. H is the height or width of the slot.

Note: K and K' are indexes of loss in axial kinetic energy. Interpolate as required. Departures from maximum value indicate losses in first and second zones when compared with the jet from a rounded-entrance, circular nozzle.

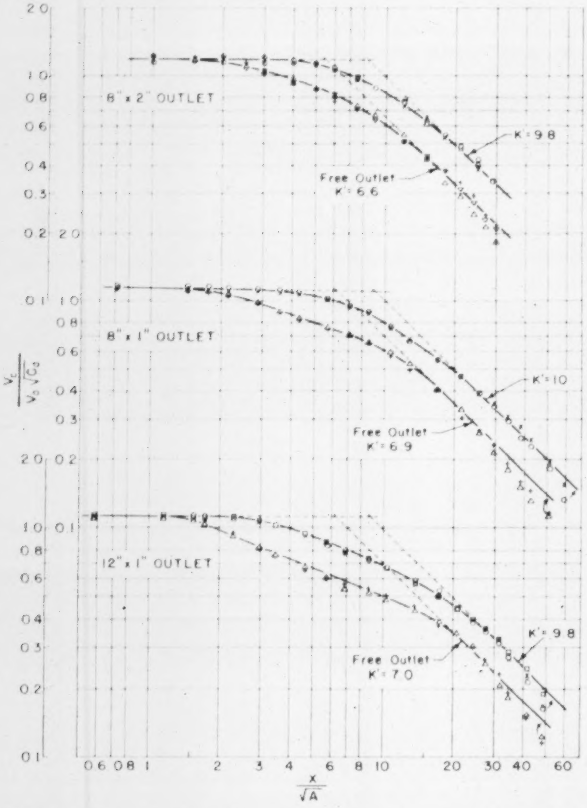


Fig. 2—Effect of increasing aspect ratio of rectangular outlets. Lower curve for free outlet; upper curve for outlet discharging along a wall or ceiling as in Fig. 10

While the dimensionless character of Equation 1 would indicate that the behavior of the jet is the same irrespective of the Reynolds number, several of the tests indicate that this is not strictly true. Slightly lower values of K are obtained for the lower outlet velocities and for very small diameters, indicated in Tables 1 and A-1. (For data and discussions on the Reynolds number effect see References 4 and 5).

A few studies of non-isothermal horizontal jets and jets of gases other than air, discharging to atmosphere, have indicated that the relationship of Equation 1 is not greatly affected by the difference in density, although the centerline of the jet will curve upward or downward.

Type 2 — Rectangular Outlets: After full turbulent flow is established, *i.e.*, in Zone 3, the free jet from a rectangular outlet of low aspect ratio can hardly be distinguished from the jet from a round nozzle. Zone 2 is elongated as the aspect ratio is increased. With aspect ratios as high as 15 or 20, Zone 2 may extend to 20 or 30 diameters but there is a definite Zone 3 of greater length than Zone 2.

Theoretically, for an infinite slot the centerline velocity varies inversely as the square root of the distance, $[V_c\ (X)^{\frac{1}{2}} = C]$. Becher's test[6] on a 0.53 in. x 10.8 in. slot showed a square root relationship (Zone 2) between $X/(A)^{\frac{1}{2}} = 2$ and $X/(A)^{\frac{1}{2}} = 30$, with Zone 3 extending therefrom to about $X/(A)^{\frac{1}{2}} = 130$. Albertson[7], testing 6-ft long slots of widths 0.03 to 0.25 in. with guarded ends, (*i.e.* discharging between parallel end walls), found the square root relationship was continuous to $V_o/20$, which amounted to a distance of some 2000 slot widths.

Results of experiments at Case Institute of Technology by W. Kerka show the increase in the length of Zone 2 as the aspect ratio is increased, Fig. 2. The outlets used in these tests were rectangular, rounded-entrance nozzles mounted on a 3-ft cubical plenum chamber supplied from a metering duct. In these tests, the value of the throw constant K' is only slightly less than that for a round outlet, even when the aspect ratio is increased to 12. (See Appendix, Table A-2 for additional data.)

Type 3 — Grilles, Grids, and Perforated Panels: The performance of multiple outlets can be correlated in terms of free area, and Equation 1 is still applicable for determining centerline velocities. Since the throw constant K is an index of the directional axial kinetic energy in the free jet in the third zone, it is expected that the values of K will be lower for multiple jets than for a single jet, especially when the jets are widely spaced as compared with their diameter. Grids and perforated panels of low free area (or high *grid density*) are such examples. The grid pattern and spacing should be related to the distance required for the formation of the coalesced, uniform jet, to the energy losses, and to the resulting value of K. When the free area is 50 or 60 percent or above, the behavior is much like that of a free-open outlet of the same free area. Rydberg and Norback[8] state that for concentrated discharge openings of circular or rectangular holes and grids of various constructions, *the form of the holes or the distance between them does not matter.* Nottage[9] used two square-mesh grids of 44 percent free area in series as a turbulence producer and added to the turbulence by radial inward jets between the grids. He reported no difference in the Zone 3 centerline velocity with this combination, as compared with a free-open nozzle, except at very low outlet velocities. Values of K' from 4.8 to 6 are reported by Koestel[10] for three straight-flow bar grilles of 72 to 84 percent free area and a value of 6.2 for a perforated panel of 40 percent free area. Tests at Case showed a definite reduction from $K' = 6.2$ to $K' = 4.5$ when the outlet of an 8-in. nozzle was covered by a perforated panel of 9.1 percent free area, (see Figs. 3 and 6, Ref. 10). F. Tenelius reports[11] $K' = 4.5$ for a panel with 3.5 percent free area. These and other data indicate a throw constant K' in the range of 3.0 to 4.5 for multiple outlets of 3 to 10 percent free area, and 4.5 to 6 for greater free areas. The great variety of designs limits the accuracy of predictions.

Type 4 — Annular Outlets, Axial Flow: An investigation of outlets of the type shown in Fig. 1 (A) was made at Case Institute of Technology by C. K. Barton. He showed that with an annular slot of 14 in. O.D. such a ring-type jet converges and forms, within two or three diameters, a normal free jet (as in Zone 3) for which Equation 1 again applies. He correlated the values of K' on a free-area basis, and the results of tests on three outlets are shown in Fig. 3. Diminishing values of K' as the slot width and the ratio of free area to gross area is reduced, (same outside diameter), again indicate the large losses of directional kinetic energy in the formation of the coalesced jet.

Fig. 4 is a smoke-pattern photograph of the jet, showing the successive convergence and divergence. Complete stream traverses were made for 14 combinations of slot area and outlet velocity. The average ratio of maximum centerline velocity to average volume velocity from these data was 2.5. The ring-type outlets, used by Barton, were rounded-entrance nozzles.

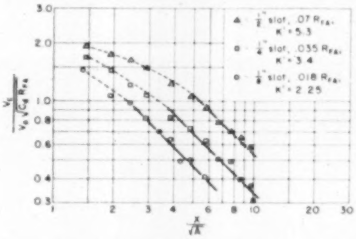


Fig. 3—Centerline velocities in the jet from annular outlet, Fig. 1(A)
(O.D. = 14 in., V_o = 700 to 3300 fpm)

Angle of Divergence of Axial Jets

After computing the velocity at any desired point along the axis of the jet by Equation 1, it is required to find the cross-sectional jet pattern, *i.e.*, the velocity gradient or profile. One key to the cross-sectional dimensions is the natural discharge angle of a free jet. But here three difficulties are encountered: *(1)* if the outlet is not round or square, or if it is located near a wall or ceiling, the jet is not symmetrical; *(2)* the diameter of the jet decreases rapidly near the end of its throw; *(3)* the periphery of the jet is difficult to define and to measure because of the billowing turbulence encountered.

However, the natural free-jet angle is more persistent than might be expected. Either by smoke pictures, velocity measurements or theoretical computation of velocity profiles, several investigators have determined the angle of a circular jet. The early work of Zimm[12] for an air jet from a 2-in. open pipe, indicated a variation of jet angle with velocity, and a 20 deg angle at 1000 fpm. Using a hot-wire instrument and silk threads, he measured a 17 deg jet angle at 600 fpm and a 27 deg jet angle at 2400 fpm. Becher[6] measured smoke patterns from a variety of round nozzles and orifices 2 to 8 in. diameter, in the range 600 to 10,000 fpm and reported an average angle of about 24 deg, with but little variation due to type or size of outlet or face velocity. Ruden[13] reported a 16 deg angle for a heated jet from a 3-in. round nozzle. Albertson[7] showed test points to include a jet angle of about 20 deg, but the extreme edge of the jet formed a slightly greater angle. Nottage[14] measured jet angle by the direction of the individual velocity vectors, using smoke indication, and found an average angle close to 20 deg, again irrespective of velocity over the range 100 to 6000 fpm outlet velocity. Jet-angle determinations previously reported from work at Case Institute of Technology have been based on velocity measurements with thermal and bridled-vane anemometers, and most of the results for round or square outlets have shown a jet angle close to 22 deg. The angle is very definite near the outlet.

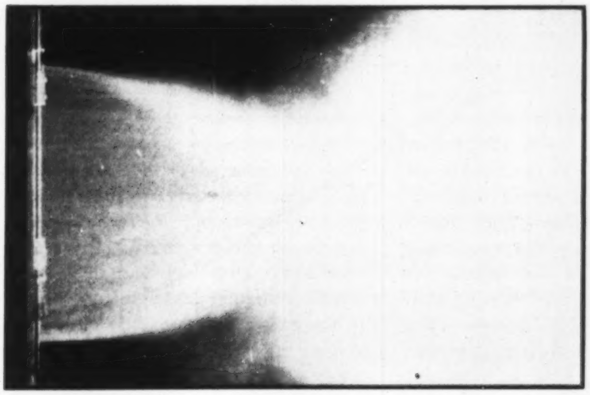


Fig. 4—Smoke-pattern photograph of the jet from annular outlet, Fig. 1(A)
(V_o = 3000, slot 0.5 in. wide, 14 in. O. D.)

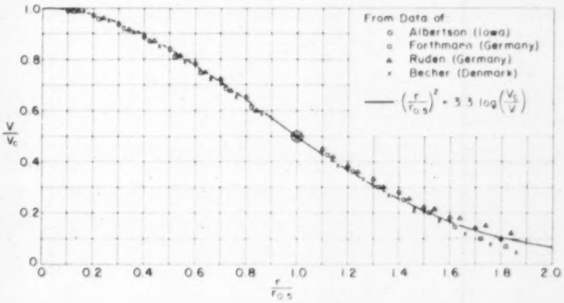


Fig. 5—Cross-sectional velocity profiles for straight-flow turbulent jets

but it is easily affected by external drafts or by proximity of walls and other surfaces. Nottage, using a 6-in. nozzle, 7 ft from the ceiling in a 47 ft wide room, found that in elevation the 20 deg jet angle persisted only about 30 diameters while the plan view showed the 20 deg jet angle for a distance of almost 100 diameters.

Jet angles for other than square or circular outlets are about the same as the angle of a circular jet once the turbulent stream is fully established. Tests at Case[4] on 5 free-open slots 24 in. long and 1/4 in. to 3 in. wide all gave measured jet angles in the range 22 to 23 deg. Other tests at Case on rectangular outlets of aspect ratio 5 or less, showed jet angles of 20 to 24 deg.

When multiple jets and a low percentage of free area are involved, the coalesced free turbulent jet usually diverges at an angle less than 20 deg. Barton's data on axial jets from annular openings, Fig. 1 (A) indicated a stream angle of about 18 deg in Zone 3.

Jet Velocity Profiles

The theoretical analyses of jet performance are based on the similarity of the curves of axial-velocity *vs.* radial-distance (perpendicular to the jet axis). In other words the cross-sectional velocity patterns should be both symmetrical and similar when measured from any point on the jet axis and they form a single curve on dimensionless coordinates. Within limits of experimental error, this has been confirmed in velocity traverses of free jets, (in Zone 3), by many experimenters.

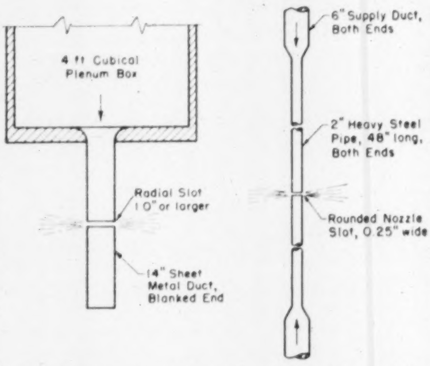

4 ft Cubical Plenum Box
Radial Slot 1.0" or larger
14" Sheet Metal Duct, Blanked End
6" Supply Duct, Both Ends
2" Heavy Steel Pipe, 48" long, Both Ends
Rounded Nozzle Slot, 0.25" wide

Fig. 6—Two experimental units used for study of radial jets

Cross-sectional velocity and temperature profiles for various heated, cooled and isothermal jets have been computed according to both the momentum-transfer theory, (Prandtl-Tollmein), and the vorticity-transfer theory, (Taylor-Goldstein). Modifications of both theories have been made to bring the results more closely into line with experimental traverses. Both Ruden[13] and Forthmann[15] made comparisons of their experimental velocity profiles with those computed by Tollmein's[16] momentum transfer theory. Howarth[17] concluded that the momentum-transfer theory predicted velocity profiles closer to the actual than did the others. Becher[6], Schmidt[3], Corrsin[18] and Nottage[5] also made comparisons of their experimental traverses with the theoretical predictions. The general results of such studies seem to be that the modified theories predict the velocity profiles with fair accuracy, and that the velocity, temperature and density profiles are similar but do not coincide. Corrsin[18], Hinze[19] and others have shown experimentally that for horizontal jets the effects of temperature or density difference upon cross-jet velocity profiles are small.

It has been demonstrated by Albertson[7], Taylor[20], Keagy[21], Pai[22] and others, that the Gauss error-function curve (probability curve) is superior to the curves predicted from theory for practical matching of experimental results. Following this suggestion, Fig. 5 has been prepared from the composite experimental results of Albertson[7], Becher[6], Ruden[13] and Forthmann[15], and these have been found comparable with data taken at Case Institute of Technology. This curve, of course, represents only one-half the jet, the other half being a symmetrical duplicate.

A convenient device, used in Fig. 5, for comparing both theoretical and empirical curves has been to determine at each cross-section of the jet the radius $r_{0.5}$ at which the axial velocity is one-half of the velocity at the centerline. All curves then pass through the same point at $V/V_c = 0.50$. The equation of the velocity profile, Fig. 5, is conveniently approximated by a simple equation using common logarithms:

$$\left(\frac{r}{r_{0.5}}\right)^2 = 3.3 \log \frac{V_c}{V} \quad \text{------------------} (2)$$

where

r = the radial distance of the point under consideration, from the center-line of the jet.

$r_{0.5}$ = the radial distance in the same cross-sectional plane to the point where the velocity is one-half the centerline velocity.

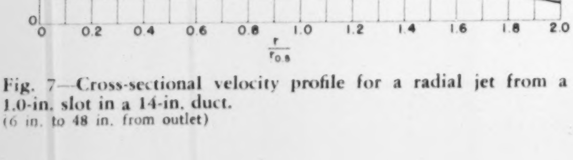


Fig. 7—Cross-sectional velocity profile for a radial jet from a 1.0-in. slot in a 14-in. duct.
(6 in. to 48 in. from outlet)

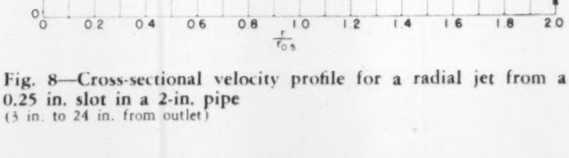


Fig. 8—Cross-sectional velocity profile for a radial jet from a 0.25 in. slot in a 2-in. pipe
(3 in. to 24 in. from outlet)

Table 2—Tests of Rectangular Rounded-Edge Outlets with and without Adjacent Wall (Kerka)

Outlet Size In.	Aspect Ratio	Coeff. of Discharge	Outlet Velocities V_o, fpm	Values of K', Equation 1a	
				Free Outlet	With Wall, Fig. 10
4 x 4	1	0.782	1500 — 2600	7.0	8.9
8 x 2	4	0.819	1800 — 2750	6.6	9.8
8 x 1	8	0.883	2200 — 2800	6.9	10.0
12 x 1	12	0.897	1950 — 2750	7.0	9.8
16 x 1	16	0.883	1900 — 2600	5.4	7.3

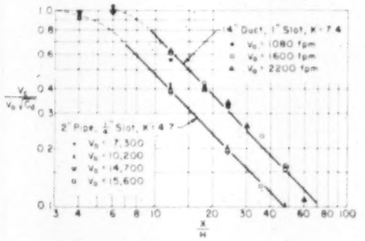


Fig. 9—Centerline velocities in jets from radial outlets, Fig. 1(B)

V_c = the centerline velocity in the same cross-sectional plane.
V = the actual velocity at the point being considered.

Albertson's[7] data for the locations of $r_{0.5}$ indicated that the conical angle for this part of the jet was about 10 deg. Another investigator reported about 11 deg. It is apparent from Figs. 5, 7 and 8 that the conical angle for 0.5 V_c and $r_{0.5}$ is approximately one-half the total angle of divergence of the jet. It should be noted that experimental data may be used to express both $r_{0.5}$ and V_c in terms of X, the axial distance from the discharge face. For instance if the angle of the $r_{0.5}$ cone is 10.5 deg, $r_{0.5} = X \tan 10.5 \text{ deg} = 0.185X$.

More work is needed to determine the true nature of the flow near the periphery of the jet. When the curve of Fig. 5 is used to determine velocities below 150 fpm, the result will probably be higher than the actual velocity in the stream due to the effects of viscosity and the probability of external air currents. Therefore, at great distances from the outlet the error-function curve predicts higher velocities and an apparent wider spread of the jet than actually occurs.

While Fig. 5 is based on symmetrical jets with a constant angle of divergence, it may be used for engineering estimates for other jets. Most departures from the ideal symmetrical jet tend to produce lower velocities than those computed (from Fig. 5 or Equation 2) for the conical jet. Hence the computed velocity will be the maximum that could be expected. A knowledge of this extreme condition is of great importance to the engineer.

For air streams from multiple outlets such as grilles and perforated panels, it has been demonstrated by Koestel[10], Corrsin[23], and others that the velocity profiles of the final jets in the third zone are very similar to those for a round nozzle, but the angles of divergence may be slightly different, usually smaller.

Performance of Radial Jets

The diameter of a conical jet increases directly as the axial distance from the outlet, (or, strictly speaking, from the apex) hence the area of the jet increases as the square of the axial distance. In a true two-dimensional plane jet the area increases only as the first power of the axial distance. The radial jet, Fig. 1 (B) might be called two-dimensional, but while its width (divergence) varies as the first power of the distance from the outlet, its circumference also varies directly as the distance from the outlet. Hence its area varies as the square of this distance, the same as that of a conical jet. It might therefore be expected that both the centerline velocity gradient and the cross-sectional velocity profiles in a radial jet would be similar to those of a round conical jet if the natural angles of divergence of the jets are nearly the same. Experiments have shown that such is the case.

Two sets of experiments on free radial jets have been conducted at Case Institute of Technology by K. Kjolner. In the first group, a 14-in. round duct was used, with air supplied from one end only, Fig. 6, and the outlet was a sharp-edged, continuous slot around the duct. In other words, the slot was an opening between two sheet metal ducts, the supply duct and a dead-end duct, each 20 in. long. In a series of tests from 1000 fpm to 2500 fpm outlet velocity the angle of divergence of the jet was observed to be substantially constant at about 23 deg. These readings were made both with smoke (as described by Nottage) and by means of a sensitive null-type double impact tube device.

In the second test set-up, Fig. 6, the air was supplied from both directions, using 2-in. heavy pipe, and the discharge slot was accurately machined to standard flow-nozzle contour. In a series of tests with a slot width of 0.25 in. and various nozzle discharge velocities up to 15,000 fpm, the angle of the jet was again found to be practically independent of the initial jet velocity. Jet angles measured by smoke technique averaged 22 deg. From these two groups of tests, under widely differing conditions, it was concluded that free, radial, 360-deg jets assume the same natural angle of divergence as round, conical jets.

Complete 360-deg jet traverses were made of radial jets at various outlet velocities, using both units of Fig. 6. Thermal instruments (frequently calibrated) were used for the lower velocities, and impact tubes for most of the measurements above 1000 fpm. Two of the important findings were that (1) the centerline velocity gradient in Zone 3 follows the hyperbolic law stated by Equation 1, and (2) the cross-jet velocity patterns or profiles at various distances from the outlet face are similar and are comparable with the profiles observed in a conical jet. Typical results in support of the latter conclusion are presented in Figs. 7 and 8.

Data on the centerline velocity gradient in these radial jets are given in Fig. 9. In this case the velocity ratio (on ordinates) has been plotted against X/H, where H is the height or width of the annular slot. Hence the constant K' is different from that defined by Equation 1, although nu-

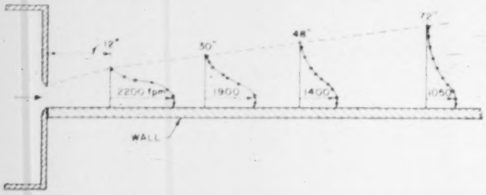
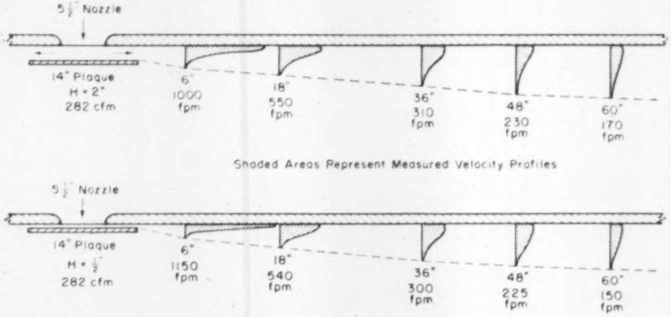


Fig. 10—Jet velocity patterns for a square outlet discharging along a wall or ceiling
($V_0 = 2260$, $A = 0.10$, $C_d = 0.78$)



Shaded Areas Represent Measured Velocity Profiles

Fig. 11—Air jets from a 14-in. ceiling plaque for two slot widths with same cfm flow

merical values are comparable. In effect this treats the jet as if it were being discharged from a square outlet of area H^2. The mathematical solution will be given later in a more complete report on the radial jet studies.

Effect of Walls and Ceilings

The jet explorations reported by Nottage demonstrated clearly that when the axis of a long jet is too close to the wall, floor or ceiling, and parallel with it, the spread of the jet in that direction is reduced. What about the extreme case in which the wall or ceiling coincides with one edge of the outlet?

Five rectangular outlets were tested at Case by Kerka, both with and without adjacent walls. Data on the decrease of maximum jet velocity with distance from the outlet have been given in Fig. 2 for three of the five outlets. The results clearly show a greater throw of the stream with the wall in place than was obtained from the same outlet discharging into free-open space. Additional data are given in Table 2. A graphic representation of the velocity patterns with the wall in place is given in Fig. 10. The persistence of the maximum velocity very close to the wall surface was observed in all cases. The angle of divergence of the jet perpendicular to wall was slightly less than one-half the angle of a free conical jet, while the angle of spread of the jet along the wall was greater than the divergence of a conical jet.

The longer throw of a jet along a surface is what should be expected from a careful analysis of the conditions. Data on sidewall friction in pipes and ducts and also tests of plates and airfoils immersed in a stream indicate that the friction drag between the jet and the wall is very small. Hence, it might be expected that the jet from an outlet of area A discharging parallel with a solid wall would be the equivalent of one half of a jet from an outlet with area 2A, bisected by a thin sheet through its axis. Since the maximum velocity at any cross section of a jet is proportional to the square root of the area, Equation 1, the value of K or K' for a jet adjacent to a wall should then be greater than that for a free jet by the factor $(2)^{\frac{1}{2}}$. The jet should be wider as well as longer than a free jet. The conjectures have been confirmed by Becher[6] and also by the work of Kerka and Kjolner (see Table 2).

Radial Jets From Ceiling Plaques

Studies of jets from ceiling plaques Fig. 1 (C) were made with 5.44-in. and 14-in. diameter supply nozzles, three plaque diameters, and slot widths from 0.5 to 4 in. The general nature of the jets was the same in all cases, with the maximum jet velocity persisting within less than 1 in. of the ceiling surface, even at considerable distances from the slot outlet, as shown in Fig. 11 and Table 3. This figure indicates that when a given volume of air is to be discharged from a plaque, the width of slot or distance of the plaque from the ceiling has little effect on the final jet pattern or velocities. This is strikingly illustrated by the more complete data of Table A-3 in the Appendix. This table shows further that the plaque diameter can be varied with only a small effect on the final stream, as regards either the maximum residual velocity at a distance from the slot or the spread of the jet. Moreover, the angle of jet divergence was less than 10 deg in all tests.

It should be noted that these data were summarized from full velocity traverses of the streams, involving in many cases the cross-sectional traverses and curve plotting on eight radii, 45 deg apart. With the equipment properly adjusted, there was little difference in the jet profiles in the various radial directions.

If this form of device is important enough to warrant full investigation, additional data will be required as a basis for accurate quantitative predictions.

Application to Engineering Design

The foregoing summary of results of studies on axial and radial jets can be used as a basis for engineering design of supply outlets for a given space. The chief limitation would be that these data apply only to straight-flow axial or radial ventilating outlets, and not to outlets with guide vanes at the discharge face, or those that are expected to carry large heating or cooling loads.

Example 1—As a simple example in finding jet velocities, consider a 24 x 8 in. sidewall ventilating grille and assume that it has a gross (core) area of 1.0 sq ft. of which 70 percent is free area. It is delivering 850

Table 3—Results of Tests of Ceiling Plaques
14-Inch Nozzle, 14-Inch Plaque[a]

Distance from Outlet, Inches	6	12	24	36	48
Slot Height, 1.0 in. — 470 cfm					
V_c max, fpm	1400	1100	560	440	310
Distance, ceiling to V_c, in.	0.4	0.4	0.4	0.4	0.4
Width of jet, in.	2.0	2.7	3.7	4.5	5.3
Slot Height, 1.0 in. — 500 cfm					
V_c max, fpm		1160	650		340
Distance, ceiling to V_c, in.		0.4	0.4		0.5
Width of jet, in.		2.7	3.4		4.0
Slot Height, 1.0 in. — 703 cfm					
V_c max, fpm		1390	890	600	455
Distance, ceiling to V_c, in.		0.5	0.4	0.4	0.4
Width of jet, in.		3.2	4.6	5.3	6.1
Slot Height, 2.0 in. — 1300 cfm					
V_c max, fpm		1050	950		
Distance, ceiling to V_c, in.		0.4	0.6		
Width of jet, in.		6.0	6.5		

[a] Data obtained by K. Kjolner

cfm, and its coefficient of discharge C_d is 0.80. It is required (*a*) to find the distance from the outlet face at which the maximum velocity will have been reduced to 150 fpm, and (*b*) the velocity with which the jet will strike a structural column that is located 15 ft (perpendicular) from the grille and 42 in. to the left of the jet axis.

The outlet velocity at vena contracta is computed from the given data to be 1515 fpm. Then from Table 1, the value of K' is estimated to be 5.2. Since in question (*a*) the value of V_c is to be 150 fpm, the ratio $V_c/V_o(C_dR_{FA})^{\frac{1}{2}}$ is computed as 0.132. Then from Fig. 12 (Equation 1*a*) $X/(A)^{\frac{1}{2}}$ is 39.3. Since $A = 1$, at a distance of about 39 ft from the grille the maximum velocity will not exceed 150 fpm.

For question (*b*) Equation 2 or Fig. 5 is used. It is required to find V, and r is given as 3.5 ft but $r_{0.5}$ and V_c must be computed. Again using Equation 1*a*, V_c is found to be 393 fpm. As previously stated, the jet angle of $r_{0.5}$ is about 10.5 deg, hence in this case $r_{0.5} = 15 \tan 10.5 = 2.78$ ft. Then $r/r_{0.5} = 1.26$, and from Fig. 5, $V/V_c = 0.33$. Hence the velocity of impingement at the column is 393 x 0.33 = 130 fpm.

Conclusions

Ventilating jets from annular outlets, either axial or radial may be analyzed by the same methods used for straight-flow, round jets. The hyperbolic law $V_cX = C$ is a close approximation for the centerline velocity gradient in the major zone of the jet in all cases except that of a very long slot, when the relation changes to $V_cX^{\frac{1}{2}} = C$. Cross-sectional velocity profiles are obtainable with engineering accuracy by a simple form of the probability curve, Equation 2, when the jet angles are assumed from reported data. A jet discharged along a wall or ceiling behaves like one-half a symmetrical jet and the maximum velocity occurs very close to the surface. Hence the throw and spread of such a jet are greater than those of a free jet.

As the procedures given in this paper for finding the jet velocities are obviously based on several approximations, more accurate methods should be sought through further research. The two recommended equations must be used with caution for extreme axial and radial distances. The characteristics of the low-velocity regions are not yet well understood. Velocity patterns in closed rooms should be studied, with special attention to radial outlets, slots, perforated panels and other methods for circulating larger volumes of air without drafts. For both axial and radial jets, the effect of Reynolds number deserves more study, not only in Zone 3, but throughout the entire jet. The great variety of radial-jet outlets and the many operating conditions offer a large area for further investigation before the performance of all such jets can be predicted with confidence.

Acknowledgment

Acknowledgment is made for use of hitherto unpublished data from tests conducted at Case Institute of

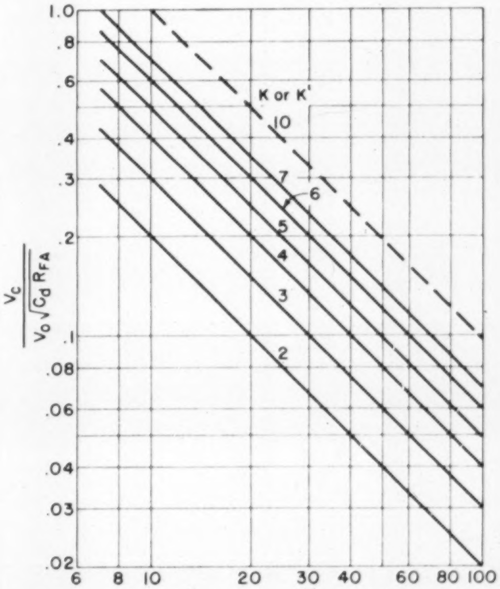


Fig. 12—Zone 3 centerline velocities of straight axial and radial jets

Technology by W. Kerka, former graduate student, C. K. Barton, former instructor in mechanical engineering, and K. Kjolner, former ASHVE Research Fellow.

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APPENDIX

Table A—1 Centerline Velocity Data, Round Outlets

Reported by	Reference	Outlet Diameter Inches	Outlet Velocity Range Fpm	Measured Range in 3rd zone (diameters)	Value of K	Value of K'
Cleve (Germany)	25	1.2, 2.0	4700 — 10600	20-100	6.0	6.8
Becher (Denmark)	6	2, 4, 8	900 — 4900	8-90	6.1	6.9
McElroy	24	5 (pipe)	7500	7-20	6.1	6.9
Albertson	7	0.25-1.00	11,200	7-250	6.2	7.0
Taylor	20	0.5	3000 — 18000	8-30	6.2	7.0
Nottage	5	6	2500 — 6000	9-75	6.7	7.5
Nottage	5	6	1000	9-40	6.1	6.9
Nottage	5	6	500	8-20	5.1	5.8
Tuve	4	6, 8, 12	5000	25-100	6.2	7.0
Koestel	10	2.5, 8.2	700 — 1700	20-100	6.2	7.0
Koestel	10	8.7, 12 (orifices)	1300 — 7100	20-120	5.8	6.6
Koestel	10	2.5 (orifices)		50-125	5.1	5.8
Ruden (Germany)	13	2.8	(Heated Air)	6-20	6.1	6.9

Note: Outlets are round-edge nozzles unless otherwise specified.

Table A—2 Centerline Velocity Data, For Square and Rectangular Outlets

Reported by	Koestel	Becher	Becher	Becher	Albertson	Kerka
Reference	10	6	6	6	7	Fig. 2
Outlet Sizes, in.	8 x 8 10 x 10	2 x 4	0.53 x 10.8	1.4 x 3.8	0.032 x 72 0.25 x 72	4 x 4 8 x 2 8 x 1
Aspect Ratio	1	2	20	2.7	Infinite[a]	1 to 8
Outlet velocity range, fpm	500 — 1600	3200 — 5100	5250	5150		
Zone ranges, $X/(A)^{1/2}$						
1st zone			0 — 1.5	0 — 5	0 — 5H	0 — 2
2nd zone			1.5 — 30	5 — 8	5 — 2000H	2 — 15
3rd zone	10 — 40	8 — 80	30 — 130	8 — 120	None	15 — 30
Value of K	4.8	7.2	5.3	6.0	[a]	6.0
Value of K'	5.4	8.1	6.0	6.8	[a]	6.8 (av.)

[a] Long slot with guarded ends to produce two-dimensional jet.

JOURNAL SECTION

Table A—3 Results of Tests of Ceiling Plaques, 5-7/16-In. Nozzle
Three plaque diameters, 6 slot widths, same cfm. Data obtained by W. Kerka

Distance From Outlet, In.	2	6	12	18	24	36	48	60	72
5-7/16 in. Nozzle, 5-7/16 in. Plaque, 282 cfm									
Slot Height, 0.5 in.									
V_e max, fpm	2300	1600	975	590	470	300	210	150	130
Distance, ceiling to V_e, in.	0.2	0.2	0.5	0.5	0.5	0.5	0.5	1.0	1.0
Width of jet, in.	1.3	1.5	2.5	3.0	3.5	4.5	5.0	6.0	6.5
Slot Height, 1.0 in.									
V_e max, fpm	1800	830	700	510	400	280	200	140	120
Distance, ceiling to V_e, in.	0.5	0.5	0.2	0.5	0.5	0.7	0.5	1.0	1.0
Width of jet, in.	2.7	3.5	3.0	3.5	3.5	5.5	5.5	6.0	6.0
Slot Height, 1.5 in.									
V_e max, fpm	1700	860	—	440	420	260	160	140	120
Distance, ceiling to V_e, in.	2.0	3.0	2.0	0.5	0.7	1.0	1.0	1.0	1.0
Width of jet, in.	4.0	6.0	7.0	5.0	4.5	5.0	6.0	6.0	6.0
5-7/16 in. Nozzle, 14 in. Plaque, 282 cfm									
Slot Height, 0.5 in.									
V_e max, fpm	1600	1150	700	540	410	300	225	150	130
Distance, ceiling to V_e, in.	0.2	0.2	0.5	0.5	0.5	0.5	1.0	1.0	1.0
Width of jet, in.	1.5	2.0	3.0	3.5	4.0	5.0	5.5	6.0	7.0
Slot Height, 1.0 in.									
V_e max, fpm	1200	875	630	480	400	280	210	150	120
Distance, ceiling to V_e, in.	0.5	0.4	0.5	0.5	0.5	0.5	1.0	1.0	0.5
Width of jet, in.	2.0	2.5	3.0	3.5	4.0	5.0	6.5	7.0	7.0
Slot Height, 2.0 in.									
V_e max, fpm	1000	1000	680	550	440	310	230	170	140
Distance, ceiling to V_e, in.	1.0	0.2	0.5	0.5	0.5	0.8	0.6	1.0	1.0
Width of jet, in.	2.5	3.0	3.0	3.0	3.5	5.0	5.5	6.0	6.5
5-7/16 in. Nozzle, 24 in. Plaque, 282 cfm									
Slot Height, 0.5 in.									
V_e max, fpm	1000	750	450		250		120		100
Distance, ceiling to V_e, in.	0.2	0.2	0.2		0.5		0.5		0.5
Width of jet, in.	1.5	1.7	3.0		5.0		6.0		6.0
Slot Height, 1.0 in.									
V_e max, fpm	700	500	350		300		170		110
Distance, ceiling to V_e, in.	0.3	0.4	0.2		0.4		0.6		1.0
Width of jet, in.	2.0	3.0	3.5		5.0		7.0		7.5
Slot Height, 1.5 in.									
V_e max, fpm	450	430	340		230		125		70
Distance, ceiling to V_e, in.	0.2	0.4	0.4		0.4		0.5		1.0
Width of jet, in.	2.2	2.5	3.0		4.1		5.5		6.5
Slot Height, 2.0 in.									
V_e max, fpm	425	460	360		240		120		85
Distance, ceiling to V_e, in.	0.4	0.4	0.4		0.5		0.4		0.5
Width of jet, in.	2.2	2.5	3.0		4.0		6.0		6.5
Slot Height, 3.0 in.									
V_e max, fpm	500	560	450		280		145		90
Distance, ceiling to V_e, in.	1.5	0.2	0.3		0.5		1.0		1.0
Width of jet, in.	3.2	3.0	3.5		4.0		5.0		5.0
Slot Height, 4.0 in.									
V_e max, fpm	600	550	475		270		150		90
Distance, ceiling to V_e, in.	2.5	0.1	0.5		0.5		0.8		0.5
Width of jet, in.	4.0	3.0	3.0		3.5		5.5		6.0

MAKE NOTE OF FUTURE

MEETING DATES

DENVER—Semi-Annual Meeting 1953—June 29-30, July 1

HOUSTON—60th Annual Meeting—January 25-27, 1954

GARDNER OPENS NEW OFFICES

C. Rollins Gardner, Fort Worth, Tex., has announced that he will operate as a mechanical contractor with offices in Fort Worth and Dallas.

Mr. Gardner recently resigned as vice president and chief engineer of Martyn Brothers with whom he had been associated since 1922.

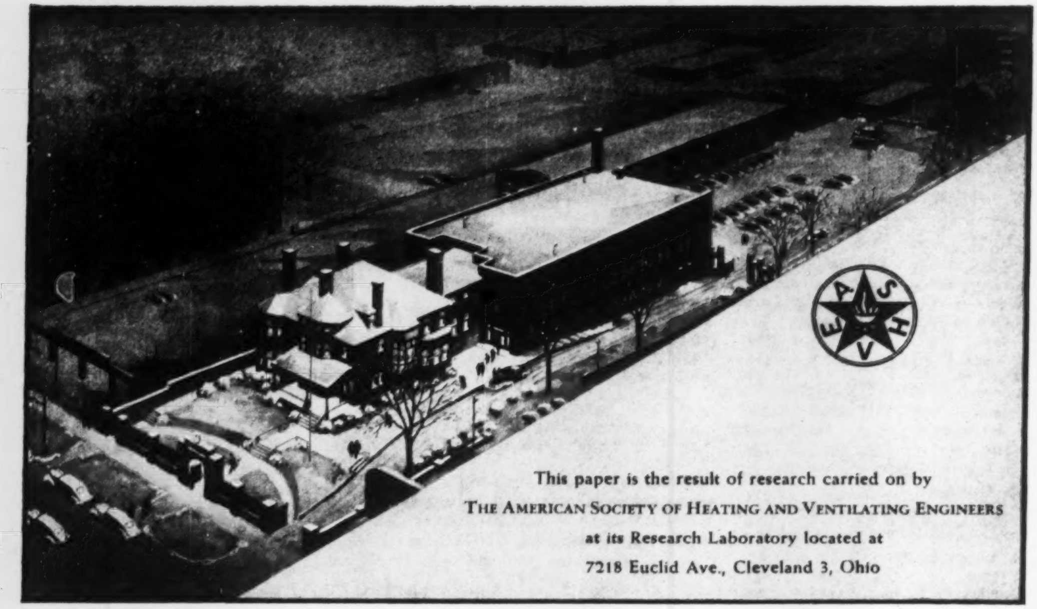
He joined the Society in 1937 and served on the Council and various committees from 1949 to 1951. He is one of the charter members of the North Texas Chapter which he served as president in 1947. In addition to his Society membership, Mr. Gardner is a member of Rotary, the Technical Clubs of Dallas, and the Engineers Club of Dallas. With this announcement, Mr. Gardner becomes the last of the "Four Horsemen of the North Texas Chapter" to open his own office within the past two years, two as contractors and two as manufacturer's representatives. Previously, E. T. Gessell had become owner of W. E. Lewis & Co., J. A. Ray established Ray Engineering Co., and G. A. Linskie formed the George A. Linskie Co.

C. Rollins Gardner

GRADY AND KNOX NAMED VICE PRESIDENTS

E. J. Grady, former general sales manager of the Pacific Boiler Division of United States Radiator Co., has been made vice president of sales for the Pacific Boiler Division. Mr. Grady has been a Society member since 1947.

J. R. Knox was also appointed vice president of the U.S. Division Sales. Mr. Knox was formerly general sales manager of this division.



This paper is the result of research carried on by
THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS
at its Research Laboratory located at
7218 Euclid Ave., Cleveland 3, Ohio

The Shading of Sunlit Glass

An Experimental Study of Slat-Type Sun Shades

By G. V. Parmelee*, W. W. Aubele**, and D. J. Vild†, Cleveland, Ohio

THIS PAPER gives the results of experimental studies of the effectiveness of slat-type shades on reducing heat gain through sunlit glass. The investigation was carried on at the ASHVE Research Laboratory as part of the long-range research program of the Technical Advisory Committee‡ on Heat Flow Through Glass.

A previous paper[1] on this subject gave a mathematical analysis by which the absorbed, reflected, and transmitted fractions of solar radiation incident upon a shade-glass combination could be computed. The present paper compares experimental determinations of the absorbed and transmitted fractions with the mathematical theory. Experimentally determined relationships between the heat gain by convection and re-radiation and the amount of solar radiation absorbed by the shade-glass combination will be covered in a later paper. Correction factors for shading effects to be applied to heat gain data for unshaded glass can be determined from these basic results; they will be the subject of still another paper.

SUMMARY—The transmittance and absorptance of solar radiation by four different slat-type sun shades was investigated experimentally. Shade color, slat-width, slat-spacing ratio, slat angle and the position of the sun were the principal factors studied. The results were in satisfactory agreement with predicted values based upon a previously given mathematical analysis of slat-type sun shades. Transmittance, absorptance and reflectance curves for a number of specific sun-shade glass combinations are given as functions of the sun's position, which is described by the profile or shadow line angle.

Scope of Experiments

In the slat-type sun shades of which venetian blinds, sun screens, and jalousies are common examples, there are many possible combinations of variables. These experiments were restricted to four shades, but these four gave reasonable coverage to the most common applications. The range of variables studied is shown in Table 1.

Test Apparatus

Heat gain measurements were made by means of the solar calorimeter previously described.[2,3] Where the slats were installed on the outdoor side of the glass, a light black-painted wood frame so constructed as to avoid partial shading of the glass by the frame held the slats at the desired angle and spacing. The closest edge of the slats was ¾ in. from the glass.

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*Research Associate, ASHVE Research Laboratory. Member of ASHVE.

**Research Engineer, ASHVE Research Laboratory. Now with Florida Power & Light Co., West Palm Beach, Fla.

†Research Engineer, ASHVE Research Laboratory.

‡Personnel: R. A. Miller, *Chairman;* N. B. Hutcheon, *Vice Chairman;* W. J. Arner, F. L. Bishop, E. W. Conover, D. D'Eustachio, W. B. Ewing, J. E. Frazier, J. S. Herbert, R. W. McKinley, E. C. Miles, D. R. Muir, H. B. Vincent, J. R. Young.

[1] Exponent numerals refer to References.

For presentation at the 59th Annual Meeting of THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, Chicago, January 1953.

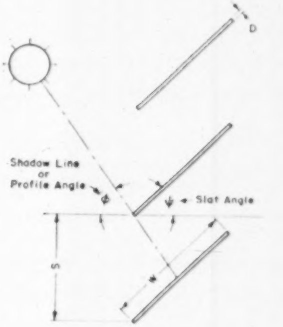
Table 1—Range of Variables Studied

1. Shade in Combination with Glass No. 2 or No. 9[a] (Transmittance of 90 percent for normally incident direct solar radiation[2]) under following conditions:

Slat Width-Spacing Ratio: W/S:	0.6, 0.8, 1.2
Slat Width, W:	0.047, 2.00 in.
Slat Thickness-Spacing Ratio, D/S:	zero (nominal), 0.025, 0.085
Slat Angles, ψ:	20, 30 and 45 deg
Slat Orientation:	Long dimension of slats horizontal
Diffuse Reflecting Slats:	Total solar energy absorptances, a, of approx. 0.3, 0.6, 0.8 for white, green, and dark colored respectively.
Specular Reflecting Slats:	Total solar energy absorptance, a, of 0.16 (aluminum)
Shadow Line or Profile angle, ϕ:	0-75 deg (see Fig. 1)
Indoor Environment:	Black body at approximately 75 F
Outdoor Environment:	Clear days in spring, summer and fall
Shade Location:	Shades both indoors and outdoors; plane of shade assembly parallel to plane of glass

2. Shade in Combination with Glass No. 6[a] (Transmittance of 41 percent for normally incident solar radiation[2]) with white shade indoors with $W/S = (1.2, \psi) = 30$ deg.

[a] Glasses described in Reference 2.



Slats installed inside the calorimeter were supported by black painted wood strips fastened to the metal surface of the calorimeter (see Fig. 2). The front edge of the slats was $\frac{13}{16}$ in. back of the glass. This setback and the support strips caused the true shaded area to be somewhat less than the clear opening of the glass. Tapes, cords and slat tilting mechanisms were omitted in all tests.

The white and green slats were standard venetian blind slats of slightly curved 2-in. wide steel strips with baked enamel paint. The dark slats were a venetian blind type of sun and insect screen of chemically treated bronze. The aluminum slats were made by cementing together two 2-in. wide flat strips of specular reflecting lighting sheet.

Temperatures of the green and the white slats were measured by thermocouples flattened and cemented to the slat surfaces. The couples for the aluminum slats were inserted between the two strips making up the slat. Those for the screen-type shade were soldered to the slats.

Test Procedure

Six different conditions for tests were used to obtain the desired information on solar energy absorptance and transmittance of slat-type shades as follows:

A. Shade Installed Outside the Glass

1. Calorimeter in a vertical position facing away from the sun. Shade and glass exposed only to diffuse solar radiation.
2. Calorimeter exposed to the direct sun; required profile angle maintained by continuous adjustment of the tilt and azimuth of the calorimeter; most tests made with zero azimuth with respect to the sun.
3. Calorimeter set in a vertical position with a fixed orientation.

B. Shade Installed Inside the Glass

1. Same as in A-1.
2. Calorimeter placed in a vertical position and exposed to direct sun; continuously rotated to maintain zero azimuth with respect to the sun.
3. Same as in A-3.

Tests for conditions A-1, A-2, and B-1 usually approximated steady-state conditions in that there were relatively small changes in solar intensity and air temperature for the duration of the test periods, which usually were ½ hr in length. Tests under conditions A-3, B-2, and B-3 were made primarily to obtain data by which convection and radiation gain could be correlated with the amount of solar radiation absorbed, and with temperature difference, wind velocity, and location and type of shade. Table A-1 (Appendix A) gives typical test data and the sequence of calculations by which transmittance and absorptance values were obtained.

Radiation Characteristics of the Slat Surfaces

Solar Energy Absorptance

The spectral absorptance values for the slats of the four different sun shades studied are shown in Fig. 3. Values for a fifth slat, E, which is used in a venetian blind type of sun and insect screen, are also given. Although values for three of the slats cover only part of the solar spectrum, about 80 percent of the total energy of the direct rays of the sun lies in this part of the spectrum, and calculations based on these values should yield a fair estimate of the absorptance for the entire solar spectrum. Calculated total solar energy absorptance values are given in the right column of Table 2.

Table 2 also gives total energy absorptance values determined by exposing the slats to direct sunlight. Samples were mounted on a block of cork covered with aluminum foil (see Fig. 2). Thermocouples were attached to the under side of each specimen and to the foil covered cork. The samples were exposed to perpendicularly incident solar radiation, the intensity of which was measured by the pyrheliometer. The incident low temperature radiation was simultaneously measured with a convection compensated radiometer.

Emissivity values of 0.92, 0.70 and 0.06 were assigned to the painted, the specular aluminum, and the aluminum foil specimens respectively. The convection conductance was computed from the observed temperature of a flat-black painted specimen, to which was assigned a value of 0.95 for both emissivity and absorptivity. Absorptance values were then determined by solving the usual heat balance equation.

Because of the foregoing assumptions, the test results can only be regarded as *order of magnitude* values. However, the value for specimen C is in reasonable agreement with the computed value, and the value for specimen B is close to the calculated value, which, as noted, applies to only part of the solar spectrum. The large difference between the test and computed values for specimen A cannot be accounted for. However, data[5] for another white paint which has nearly the same absorptance in the same region of 0.45 to 1.15 microns suggest that the absorptance for the entire solar spectrum should be about 0.30. The value of 0.19 for aluminum foil is reasonably close to the value of 0.15 quoted by Edwards[6] for visible light absorptance of commercial foil.

Reflection Characteristics

Specimen C appeared to be a perfect specular reflector. Specimens A and B both had definite specular reflection components and therefore gonio-photometer tests were made on each for light incident at an angle of 7½ deg. The results are shown in Fig. 4. The measurements were made only in the plane which contained both the incident beam and the reflected specular beam.

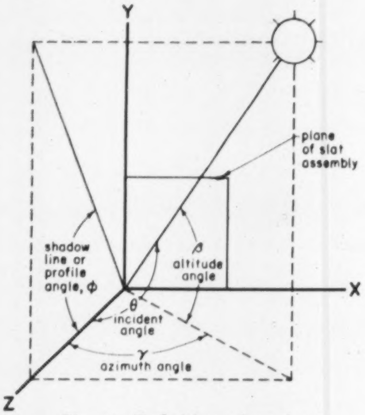


Fig. 1—Definition of angles

If a surface is a perfectly diffusing reflector, the intensity of the reflected beam follows the cosine law with the beam of maximum intensity being perpendicular to the surface. The intensity values, plotted *vs.* angle on polar coordinates, will form a circle with the value of maximum intensity as diameter. On this basis the component in the region of the angle of specular reflection was estimated to be of the order of 10 percent of the total reflected light. Measurements of the specular component by allowing the reflected light to leave the integrating sphere of the spectro-photometer gave a value of about 3 percent. Therefore, it appears that the white and green slats reasonably approximate the characteristics of a perfectly diffusing reflector. In the absence of specific data it will be assumed that specimen D slats reflect similarly.

Solar Energy Transmittance And Absorptance

Transmittance of Diffuse Solar Radiation

Diffuse transmittance values were determined from data obtained in the condition A-1 tests; the sequence of computations is listed in column 1 of Table A-1. Values for shade-glass combinations, with the shade on the outdoor side are given in Table 3, and are averages of from 4 to 10 tests. Table 3 also gives two sets of calculated values for a sky of uni-

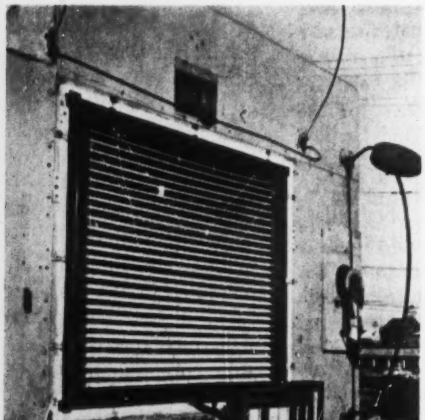


Fig. 2—Installation of white slat-type sunshade in solar calorimeter. Samples mounted for solar absorptivity tests are also shown

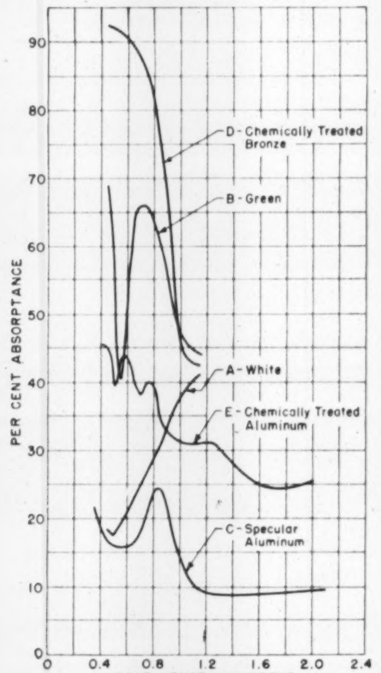


Fig. 3—Spectral absorptance of sun shade slats

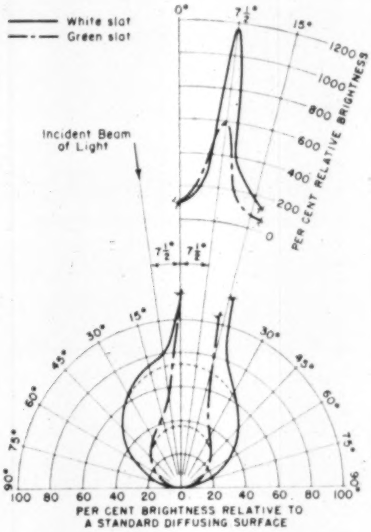


Fig. 4—Angular distribution of light reflected from white and green slats

Table 2—Total Solar Energy Absorptance Values

Specimen	Description	Absorptance Values	
		By Test In Sunlight	Calculated from Spectral Data[d]
A	White painted slat[a]	0.37	0.25[e]
B	Green painted slat[b]	0.58	0.55[e]
C	Specular aluminum	0.20	0.16[f]
D	Chemically treated bronze	...	0.80[e]
E	Chemically treated aluminum alloy	...	0.36[f]
F	Same as specimen A except 3 coats paint[c]	0.28	...
G	Aluminum foil	0.19	...

[a] 0.0008 in. baked enamel paint film on a zinc phosphate coating applied to electrolytically galvanized cold rolled steel; titanium dioxide pigment; alkyd urea melamine vehicle.

[b] same as A except paint tinted with chrome green and chrome yellow.

[c] same as A with the addition of 3 brush painted coats of titanium dioxide pigment white paint; total thickness of paint film 0.003 in.

[d] Moon's[4] solar intensity values for air mass = 2

[e] for portion of solar spectrum between 0.45 and 1.115 microns.

[f] for portion of solar spectrum between 0.35 and 2.2 microns.

Table 3—Diffuse Solar Radiation Transmittance Values for Slat-Type Sun Shades

Shade	Color	Slat Width Spacing Ratio, W/S	Slat Angle ψ	Transmittance[a]			
				Experimental		Calculated[b]	
				$T_{d,s,g}$		$T_{d,s,g}$	$T_{d,s}$
				Avg	Range		
A	white	1.2	30	0.28	0.27-0.33	0.16	0.19
A	white	1.2	45	0.26	0.23-0.27	0.09	0.10
B	green	1.2	30	0.17	0.12-0.27	—	0.13
B	green	1.2	45	0.16	0.13-0.22	0.05	0.06
C	specular aluminum	1.2	30	0.49	0.39-0.61	0.46	0.52
D	treated bronze	0.8	20	0.35	0.27-0.41	0.28	—

[a] $T_{d,s,g}$ is the transmittance, for diffuse radiation, of the combination of the shade and glass, with the shade on the outdoor side; $T_{d,s}$ is the transmittance, for diffuse radiation, of the shade alone.

[b] For sky of uniform intensity; no ground reflected radiation; based on slat absorptance values of 0.40, 0.60, 0.16, and 0.80 for A, B, C and D respectively. $T_{d,s}$ for shade A with absorptance = 0.30 would be 0.22 and 0.13 for ψ = 30 deg and ψ = 45 deg respectively.

form intensity (see Reference 1 for calculation method).

The range in the experimental values given in Table 3 is considerable and is partly due to experimental error, since small errors in the various measurements can lead to a large error in the final determined quantity when the heat flow rates are low. Undoubtedly some of the differences for a given shade are real ones and are the result of different radiation intensity distributions. Calculations based upon the standard brightness distributions of the *Illuminating Engineering Society*[7] showed that the diffuse transmittance value should vary with azimuth for a given solar altitude and that for zero azimuth, the value should decrease as the solar altitude increases (for vertical glass and zero azimuth, solar altitude and profile angle are the same).

Transmittance of Direct Radiation

Experimentally determined values of direct radiation transmittance are shown in Figs. 5, 6, 7, and 8 as functions of profile or shadow line angle. Values for white slats set at 30 and at 45 deg with a spacing ratio of 1.2 are shown in Fig. 5. The values for the 30 deg setting will be discussed in some detail. Most values shown were obtained by means of the condition A-2 tests (mainly with zero azimuth) but also included are values from one of the condition A-3 tests (fixed orientation). All data are for the transmittance of the shade combined with glass No. 9, with the sunshade on the outdoor side. Columns 2 and 3 of Table A-1 in the Appendix give typical test data and illustrate the computations. The experimentally determined value of 0.28 for diffuse solar radiation was adjusted approximately for profile angle in accordance with the calculations just discussed.

Since the total solar energy absorptance value, α, is not known with exactness, theoretical curves A and B (Fig. 5), have been drawn for diffuse reflecting slats which have absorptances of 0.3 and 0.4 respectively. The data are seen to be in good agreement with the curve for α = 0.4 but lower than the curve for α = 0.3. It will be noted that the two test points for 20 deg profile angle are much below the theoretical curves. These two tests, as well as one test for 60 deg profile angle, were made on days when the diffuse radiation, measured by shielding the pyrheliometer from the direct rays of the sun, was very high in proportion to the direct radiation. Under such conditions much of the diffuse radiation is concentrated close to the sun, and if part of it had been included with the direct radiation, the values would have been higher.

If the slat surfaces were to reflect 90 percent of the incident radiation diffusely and 10 percent specularly, the theoretical transmittance values would be 0.46, 0.31, and 0.17 for profile angles of zero, 10 and 20 deg respectively and α = 0.4. For larger angles the values would be a little lower than curve B, Fig. 5. On the whole, curve B makes the best fit with the test data. The differences between curves A and B are not very significant from the standpoint of transmittance because the values are low in the range of greatest application, namely, profile angles greater than 20 deg.

Curve D, Fig. 5, is the transmittance for shades which absorb all radiation which strikes the slats and is the product of the glass transmittance and the opening ratio expressed as a percentage. The opening ratio is defined as the width of that portion of the opening between the slats through which a direct beam can pass without striking either slat surface, divided by the slat spacing. The difference between curves B and D for any given profile angle is the fraction of the incident radiation which is transmitted by way of reflections from the slat surfaces. Curve D shows that no direct beam will enter the room if the profile angle is 21 deg or more. Curve F is the theoretical curve for the shade alone for $\alpha = 0.4$.

Curves C and E (Fig. 5) are for white slats set at a 45 deg angle, with perfectly diffusing slat surfaces, and $\alpha = 0.4$ and 1.0 respectively. The test points, based upon diffuse transmittance values adjusted as before, though a little low, are in reasonably good agreement with the theoretical curve. Note that the cut-off point for $\psi = 45$ deg is at approximately 11 deg.

Also shown in Fig. 5 are the calculated curves of reflectance and absorptance for the shades in combination with the glass. All curves have finite values out to $\phi = 90$ deg at which point transmittance and absorptance values become zero and the reflectance value becomes 100 percent. Because of the low transmittance values, and also low glass absorptance (2 percent), the reflectance and absorptance curves are substantially the same for both shades alone and shades plus glass.

Note that the 45 deg slat setting gives substantially lower absorptances and higher reflectances than the 30 deg setting for profile angles greater than the cut-off angle. The transmitted gain will be small in either case, but since the 30 deg setting will admit somewhat more light than the 45 deg setting, the 30 deg setting might be preferred for some orientations.

The slight curvature of the slats was found by investigation to have no significant effect on transmittance.

Fig. 6 gives similar data for the shade with green slats set at 30 and 45 deg. Theoretical curves A and B have been drawn for perfectly diffusing reflecting slats with $\alpha = 0.60$. The test points are in reasonably good agreement with these curves. In view of the experimental error involved, particularly at angles greater than 30 deg, the points would fit the theoretical curves for $\alpha = 0.55$ nearly as well. These would be one or two percentage points higher. The figure also shows calculated curves of absorptance and reflectance.

Nomenclature

α = solar energy absorptance, dimensionless.
β = altitude angle, (see Fig. 1) degrees.
γ = azimuth angle, (see Fig. 1) degrees.
θ = incident angle, (see Fig. 1) degrees.
ϕ = shadow line or profile angle, (see Figs. 1 and 2) degrees.
ψ = slat angle, (see Fig. 2) degrees.
$A_{d,s}$ = absorptance of shade alone for diffuse solar radiation, dimensionless.
$A_{d,g,s}$ = absorptance of glass and shade, with shade inside for diffuse dimensionless.
$A_{d,s,g}$ = absorptance of shade and glass with shade outside solar radiation, dimensionless.
D = slat thickness, (see Fig. 1) inches.
S = slat spacing, (see Fig. 1) inches.
T_D = transmittance of shade alone for direct solar radiation, dimensionless.
$T_{d,s}$ = transmittance of shade alone for diffuse solar radiation, dimensionless.
$T_{d,s,g}$ = transmittance of shade and glass, with shade outside, for diffuse solar radiation, dimensionless.
W = slat width, (see Table 1) inches.

The experimentally determined transmittances for the specular aluminum slats set at 30 deg with a spacing ratio of 1.2 in combination with and outside of glass No. 2 are shown in Fig. 7. The zero azimuth condition A-2 tests are in good agreement with curve B, which is the theoretical curve for specular reflecting slats with $\alpha = 0.16$. In accordance with theory that T_D = zero when $\psi + \phi$ is greater than 60 deg profile angle, the curve goes to zero at 60 deg. However, the test points for ϕ greater than 60 deg show small positive values. These represent differences of one to two Btu per (hr) (sq ft) between the correct values, zero, and the experimental values computed with the experimental value for diffuse radiation transmittance adjusted for profile angle. Had a constant value of 0.49 for diffuse transmittance been used, the values would have been negative by about the same amounts.

It will be noted that Curve C, (Fig. 7) transmittance for shades inside the glass, does not go to zero at 60 deg. This is so because the radiation reflected from the slats strikes the glass with such a high incident angle that a sizeable fraction is reflected. These rays return to the slat system with a negative profile angle for which the transmittance of this shade is about 0.90. The slat thickness spacing ratio, 0.025, is sufficient to put the theoretical curves drawn about two percentage points below the theoretical values for a shade which has zero thickness ratio.

It will be noted also that the calculated reflectance curve H (Fig. 7) is very low at high angles and then rises abruptly to a constant value of 84 percent at $\phi = 60$ deg. Curve G for the shade indoors is influenced by the glass reflectance. The absorptance curves and data will be discussed in a later section.

Fig. 8 shows values for shade D outside of and in combination with glass No. 2. A theoretical curve, Curve B, for diffuse reflecting slats with $\alpha = 0.8$ is in good agreement with the experimental data. As before a value of diffuse transmittance which varied with profile angle was used in the computations, which are illustrated by columns 2 and 3 of Table A-1. Comparison of Curve D for $\alpha = 1.0$ with Curve B shows that very little radiation passes through the shade by reflections from the slats. Most of this is due to the first reflection from the upper side of the slats through the rather wide spacing.

The slat thickness spacing ratio was taken into consideration in computing the theoretical curves. Curve D shows that the cut off point is at approximately 42 deg profile angle for this shade. The theoretical transmittance curve, C, for slats inside the glass is identical with Curve B except for the dotted extension between 70 and 90 deg profile angle.

Fig. 8 also gives calculated reflectance and absorptance curves for the shade in combination with glass No. 2. The absorptance curves are discussed in the next section.

Absorptance of Solar Radiation

Absorptance values were determined from the data obtained in the tests for condition B, *i.e.* with sunshade on the indoor side of the glass. Only in this arrangement could the heat balance equation which follows be evaluated:

$$\begin{bmatrix}\text{Fraction}\\ \text{absorbed x}\\ \text{incident}\\ \text{solar radia-}\\ \text{tion}\end{bmatrix} = \begin{bmatrix}\text{Convection}\\ \text{and radiation}\\ \text{gain from}\\ \text{shade and}\\ \text{glass}\end{bmatrix} + \begin{bmatrix}\text{Convection}\\ \text{heat loss,}\\ \text{glass to}\\ \text{outdoor air}\end{bmatrix} + \begin{bmatrix}\text{Low tempera-}\\ \text{ture radiation}\\ \text{loss, glass}\\ \text{to outdoor}\\ \text{environment}\end{bmatrix} + \begin{bmatrix}\text{Rate of}\\ \text{heat storage}\\ \text{in glass}\\ \text{and shade}\end{bmatrix} \quad (1)$$

Table 4—Calculated Values of Diffuse Solar Radiation Absorptance for Slat-Type Sun Shades

Shade	Color	Slat Width to Spacing Ratio, W/S	Slat Angle ψ	Absorptance		
				Shade & Glass Shade Inside $A_{d,g,s}$	Shade & Glass Shade Outside $A_{d,g,s}$	Shade Alone A_{ds}
A	White	1.2	30	0.44	0.51	0.49
A	White	1.2	45	0.43	0.48	0.47
B	Green	1.2	30	0.57	0.67	0.65
B	Green	1.2	45	0.60	0.69	0.68
C	Specular Alum.	1.2	30	0.23	0.28	0.25
D	Treated Bronze	0.8	20	0.56	0.68	0.64

Attempts to determine the absorptance of diffuse solar radiation were not altogether satisfactory because of difficulty in accurately evaluating the various terms of the heat balance equation. Inexactness in the selection of convection conductances and diffuse solar radiation transmittances appropriate to the test conditions as well as in the measurements of incident low temperature radiation, led to such wide variations in the determined value that an average value could be no more than a rough *order of magnitude* value. For example, an error of 5 Btu per (hr) (sq ft) in the determination of the incident low temperature radiation, which is an error of 5 percent in the case of the example given in column 5 of Table A-1 (see item 8) will produce an error of more than 20 percent in the value of diffuse absorptance.

Therefore, only calculated values, $A_{d,g,s}$ of the fraction of the incident diffuse solar radiation absorbed by the glass and shade together with the shade indoors, are given in Table 4. These were computed for an above-the-horizon source having a uniform intensity distribution. Because the experimentally determined transmittances were found to be higher than calculated, the absorptance values in practical cases should be somewhat lower than the table values. Other calculated values are for shades alone, and shades plus glass with the shade outside. When glass such as No. 2 or No. 9 is on the outdoor side of the shade, it absorbs about 2 percent of the incident radiation. When the glass is on the indoor side, it absorbs a small fraction, approximately 0.02 times the shade transmittance.

Total solar absorptance values for white and green shades with slats set at 30 deg are shown in Fig. 9 as a function of profile angle. The theoretical curves drawn are for $\alpha = 0.4$ and $\alpha = 0.6$ respectively and are for glass No. 2 and the sun shade together, with the latter inside. It should be noted that these curves are for direct radiation only, whereas in computing the experimental values from the heat balance data, direct and diffuse radiation were lumped together. This accounts for part of the scatter, since the absorptances of

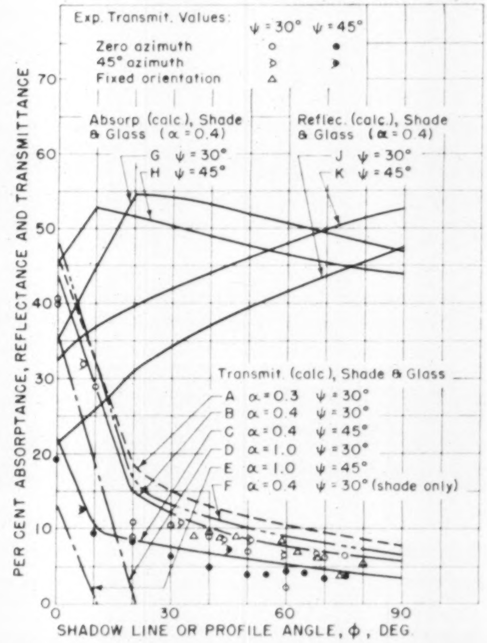


Fig. 5—Absorptance, reflectance, and transmittance of white slat-type sun shades in combination with glass No. 9

Shades on outdoor side, $W/S = 1.2$

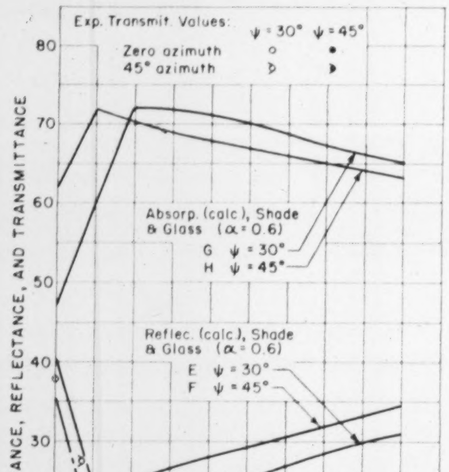


Fig. 6—Absorptance, reflectance, and transmittance of green slat-type sun shades in combination with glass No. 9

Shades on outdoor side, $W/S = 1.2$

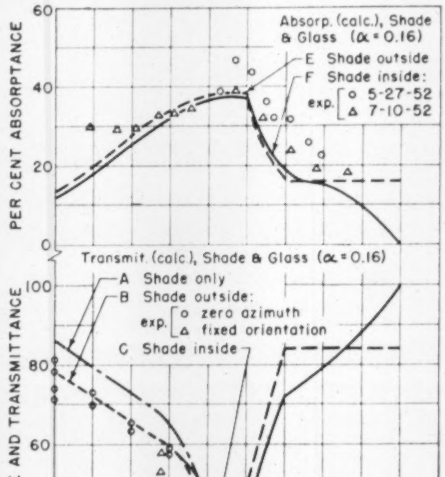


Fig. 7—Absorptance, reflectance, and transmittance of specular aluminum slat-type sun shade C in combination with glass No. 2

$W/S = 1.2$, $D/S = 0.025$, $W = 2.0$ in., $\psi = 30$ deg

the two components are not the same throughout the range of profile angles. However, the greater part of the scatter is due to the necessarily inexact evaluation of the heat balance terms as previously described.

Typical data and computations are listed in column 4 of Table A-1. On the whole the agreement of the data with the appropriate curves is reasonably good. The absorptance of the shades only when they are inside the glass would be represented by curves about three percentage points lower.

Fig. 9 also gives calculated reflectance and transmittance curves for the shade-glass combinations when the shade is on the indoor side. The principal differences between these curves and those for shades outside, which were given in Figs. 5 and 6, is between 70 and 90 deg profile angle.

Total solar energy absorptance values for the specular reflecting aluminum slats in combination with glass No. 2 are compared in Fig. 7 with the theoretical values for direct radiation represented by curve F. Absorptance values for slats alone inside the glass would be about two percentage points lower. Curve E gives calculated values for shade and glass together with the shade outside.

Fig. 8 compares experimentally determined absorptance values for shade D inside glass No. 2 with the theoretical curve F. Curve E gives calculated values for the shade outside the glass.

Discussion of Results

The adequacy of the mathematical analysis of transmittance and absorptance of solar radiation by slat-type sun shades must be judged principally on the agreement, or lack of it, between the theoretical and the experimentally determined values of transmittance of direct solar radiation, with due regard to the limitations of our experimental treatment of such a complex problem. The determination of absorptance values is in part dependent upon the experimentally determined transmittance values, so that the absorptance values are not a wholly adequate basis of judgment.

References to Figs. 5, 6, 7, and 8 illustrate the fact that the direct solar radiation transmitted by a slat-type shade can be broken down into two components. One is what might be termed the *straight-through component;* the other is the *reflected-through component.* The mathematical analysis previously presented showed that the first component is a simple trigonometric function of the slat geometry and profile angle. The second is dependent not only upon slat geometry and profile angle but also upon the reflectance or absorptance of the slat surface.

Fig. 6 for green slats and Fig. 8 for the small dark slats, shade D,

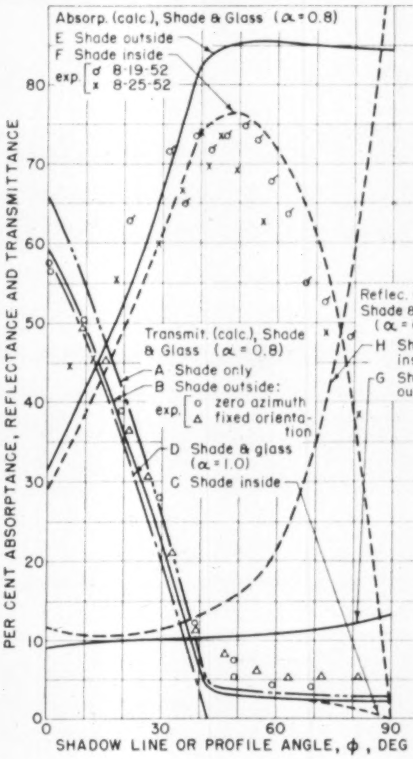


Fig. 8—Absorptance, reflectance, and transmittance of dark slat-type sun shade D in combination with glass No. 2

$W/S = 0.8$, $D/S = 0.085$, $W = 0.047$ in., $\psi = 20$ deg

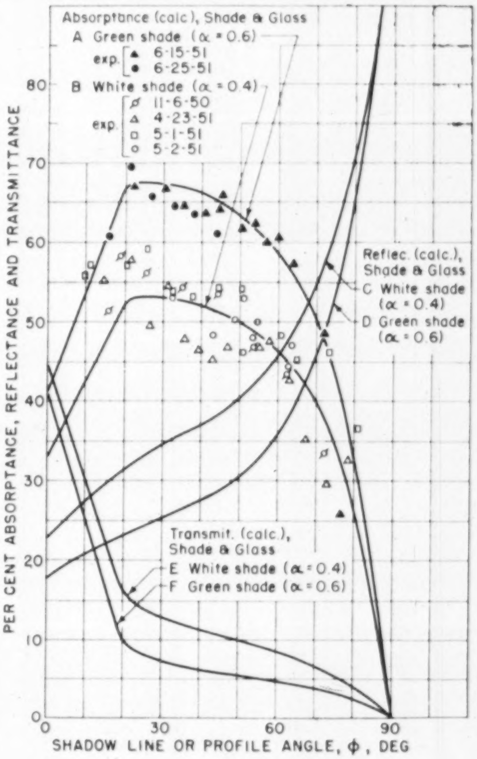


Fig. 9—Absorptance, reflectance, and transmittance of white shade A and green shade B in combination with glass No. 2

Shades on indoor side, $W/S = 1.2$, $W = 2.0$ in., $\psi = 30$ deg

demonstrate good overall agreement between the theory and experiment for shades with diffusely reflecting slats, although the absorptance values for the total solar spectrum are not known with exactness. However, the values are so high that differences of as much as 0.05 between the true values and the nominal values of 0.6 and 0.8 used in computing the theoretical curves, will not result in experimentally measurable differences in transmittance. Hence, the theory connected with the reflected-through component is not thoroughly tested in spite of the good overall agreement. In the absorptance range of 0.3 to 0.4 the experimental method seems to be adequate to test the theory of the reflected-through component. Unfortunately present knowledge of the solar absorptance value of the white slat, illustrated by Table 2 and the accompanying discussion, is inadequate. However, differences between values for the green slats and the white slats, for the same shade geometry and profile angle, are in good agreement with the differences to be expected theoretically for absorptance values of 0.6 and 0.4. The maximum effect of α occurs at the cut-off point. The difference is 7 percentage points at 20 deg profile angle for $\psi = 30$ deg and about 5 points at $\phi = 10$ deg for $\psi = 45$ deg. The differences between transmittance values for slat surface absorptance of 0.6 and 0.3 would be 11 and 8 percentage points for $\psi = 30$ deg and $\psi = 45$ deg respectively. Judged on this basis, the theory related to the reflected-through component would appear to have practical usefulness.

The theory for specular reflecting slat surfaces is quite straight forward, though the equations appear rather formidable. The absorptance of 0.16 for specular aluminum is low enough that both the straight-through and the reflected-through components are adequately tested and verified by experiment. A change of 0.05 in α in the region of 0.15 will produce a change of almost 10 percentage points at $\phi = 30$ deg.

The effect of energy distribution on shade performance must not be ignored. Calculations based on Moon's[4] suggested standards for direct solar radiation for the white and aluminum slats show that the change in energy distribution with air mass causes no significant change in the absorptance for the total spectrum. This may not hold for the visible region and therefore should be considered in illumination problems related to sunshades.

The effect of heat absorbing glass on the behavior of an indoor shade should be significant. Inspection of Fig. 3 shows that solar energy which is depleted in the infra-red region will raise the average absorptance of specular aluminum slats and decrease it for the white slats. Conversely, a shade on the outdoor side will influence the performance of the heat absorbing glass.

The effects of such factors as polarization and change of absorptance with change of incident angle were not treated in the theory, though the second can be treated; nor are they disclosed in the experimental work.

On the whole the theoretical treatment of slat-type sunshades seems to be confirmed by these experiments as a practical working tool in the development of design data for shades. The specification of design conditions as to shade reflection characteristics and geometry is an important practical problem but outside the scope of this paper. The very important problem of convection and radiation gain from shade-glass combinations must be solved in order to complete the basic knowledge necessary in developing sound design data. This will be treated in a paper now in preparation.

Acknowledgment

The authors acknowledge with thanks the assistance of their colleagues of the ASHVE Research Staff in the work described in this report and are grateful for the interest and technical guidance of the Members of the TAC on Heat Flow Through Glass. In particular they thank W. B. Ewing of the Ewing Development Co. and J. R. Young of the Kaiser Aluminum Co. for technical data furnished.

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APPENDIX A

Table A-1—Typical Test Data and Calculations by which Absorptance and Transmittance Values Were Obtained

All Values are for White Shade with $W/S = 1.2$ and $\psi = 30$ deg in Combination with Glass No. 9.

	Test No.	1	2	3	4	5
	Date	8-15-50	8-16-50	8-16-50	4-23-51	4-23-51
	Time (Sun)	12:30-1:00	2:00-2:30	10:45-11:15	4:30	9:30-10:00
	OBSERVED VALUES					
1.	Location of sunshade	Out.	Out.	Out.	In.	In.
2.	Incident angle	—	0	50	46.6	—
3.	Tilt of calorimeter, deg from vertical	0	49.2	8.3	0	0
4.	Azimuth of calorimeter, deg west from south	180	57.5	331.3	45	45
5.	Profile angle, deg	—	0	50.0	31.8	—
	Incident radiation, Btu/(hr) (sq ft):					
6.	Direct solar	—	251.5	148.0	142.8	—
7.	Diffuse solar	25.0	43.8	49.3	32.4	22.0
8.	Low temperature	—	—	—	108.3	95.0
	Wind Conditions					
9.	Wind velocity, mph	4.8	7.0	5.4	4.2	6.6
10.	Wind direction	N	W	NW	NW	NW
	Temperatures, Fahrenheit:					
11.	Calorimeter, t_c	76.6	80.6	79.4	74.8	69.5
12.	Glass, t_g	81.6	90.5	88.2	73.8	51.0
13.	Sun shade, t_s	82.1	94.3	99.8	97.5	66.2
14.	Outdoor air, t_o	83.3	86.5	85.1	52.4	45.6
	DERIVED QUANTITIES COMPUTED FROM OBSERVED VALUES All Heat Flows in Btu per (hr) (sq ft)					
	Calorimetry:					
15.	Gain by coolant	17.6	134.0	34.2	65.7	−29.2
16.	Calorimeter heat losses	−5.3	−5.1	−1.7	7.4	18.4
17.	Corrected gain[a]	12.3	128.9	32.5	73.1	−10.8
	Derived Quantities, Shade Outdoors:					
18.	Gain due to convection and radiation from glass[b]	5.5	11.3	10.2	—	—
19.	Gain due to transmitted solar radiation[c]	6.8	117.6	22.3	—	—
20.	Fraction of diffuse solar radiation transmitted	0.27[d]	0.32[e]	0.24[e]	—	—
21.	Gain due to transmitted solar radiation[f]	—	103.6	10.5	—	—
22.	Fraction of direct solar radiation transmitted[g]	—	0.41	0.07	—	—
	Derived Quantities, Shade Indoors:					
23.	Fraction of direct solar radiation transmitted[h]	—	—	—	0.12	—
24.	Fraction of diffuse radiation transmitted[e]	—	—	—	0.28	0.28
25.	Gain due to total transmitted solar radiation[j]	—	—	—	26.2	6.2
26.	Gain due to convection and radiation from shade and glass[k]	—	—	—	44.3	−17.0
27.	Convection loss, glass to outdoor air[m]	—	—	—	22.4	5.1
28.	Radiation loss, glass to outdoor[n]	—	—	—	29.8	21.6
29.	Rate of heat storage, glass and shade	—	—	—	−2.2	1.6
30.	Total solar radiation absorbed by glass and shade[p]	—	—	—	94.3	11.3
31.	Fraction of total solar radiation absorbed[q]	—	—	—	0.54	0.52

[a] Item 15 + item 16

[b] Based upon item 12 − item 11

[c] Item 17 − item 18

[d] Item 19 ÷ item 7

[e] Values from Table 3 adjusted for variation of $T_{a,s,g}$ with ϕ

[f] Item 19 − (item 20 × item 7)

[g] Item 21 ÷ item 6

[h] Values from curve B, Fig. 5

[j] (Item 23 × item 6) + (item 24 × item 7)

[k] Item 17 − item 25, with allowance for partial shading by window frame

[m] Based upon items 9, 10, 12 and 14

[n] Based upon items 8 and 12

[p] Items 26 + 27 + 28 + 29

[q] Item 30 ÷ (item 6 + item 7)

Pressure Losses in 4-Inch Diameter Galvanized Metal Duct and Fittings

By H. G. Conn*, W. G. Colborne**, and
W. G. Brown†, Kingston, Ont., Canada

SUMMARY — This paper presents the results of an investigation of the pressure losses due to friction which occur when air flows in small galvanized round pipe and fittings such as would be encountered in heating and air conditioning work. This work was considered necessary due to the advent of 3½ in. and 4 in. diameter air distribution systems for which there was almost complete absence of published data on these losses. This paper deals with the losses for 4-in. pipes and fittings. The pressure losses are given for 4-piece adjustable elbows and for crimped elbows as well as for various combinations of these elbows. Losses are also given for various plenum take-offs and for registers and register boxes of various designs.

Investigations were also made on runs of piping which included several different fittings and the variations between the predicted losses and the actual losses were analyzed. The velocity profile between fittings was studied in an attempt to find an explanation of the variations.

THE TREND toward the use of small pipes in warm-air heating and air conditioning has increased the need of accurate values of pressure loss in these pipes and their fittings, especially in the fittings and combinations of fittings. This initial investigation deals with the pressure losses in 4-in. pipe and fittings.

Apparatus: A major difficulty was the accurate measurement of the air flow in the range desired. The range of air flow was from 40 to 80 cfm of standard air, having a density of 0.075 lb per cu ft. The method of air measurement adopted was that given in the *ASME* Power Test Code for Displacement Compressors,[1] the ¾-in. screw type standard nozzle being used. The air was supplied by a two stage air compressor with a capacity of 290 cfm. Fig. 1 shows the arrangement of the apparatus. In order to maintain a constant pressure drop across the nozzle and hence a constant air flow during any given set of readings, it was necessary to keep the pressure in the receiver tank at approximately 95 psig. At this pressure, the air compressor unloaders which operate at 100 psig, remained inoperative and the air compressor therefore ran continuously at full load. By adjusting the pressure reducing valve and the take-off valve, the air flow through the nozzle could be varied and the pressure in the receiver tank maintained at 95 psig.

The pressure drop across the standard measuring nozzle was indicated on a 50-in. water manometer calibrated in tenths of an inch.

The plenum chamber and baffle were installed to reduce the high velocity of the jet from the nozzle and to obtain uniform flow into the 4-in. pipe. The fitting or fittings to be tested were then installed and the pressure loss through them measured on a micromanometer as shown in Fig. 1.

Air Flow Calculations

The air flow in each test was calculated by the simplified formula specified in the *ASME* Power Test Code for Displacement Compressors[1]:

$$w = 6.870 \times C D_2^2 \sqrt{\frac{P_b \Delta P}{T_2}} \text{ .... } (1)$$

Substituting for D_2 and converting to cfm of standard air Equation 1 reduces to

$$(cfm)_s = 51.5 \times C \sqrt{\frac{P_b \Delta P}{T_2}} \text{ .... } (2)$$

In order to reduce the number of calculations made in these tests, values of $P_b \triangle P / T_2$ ranging from 0.5 to 2.6 were plotted against cfm of standard air for various values of C ranging from 0.976 to 0.984.

Test Procedure

The initial tests were run to determine the pressure loss in straight 4-in. pipe. The tests on the fittings were then run locating the upstream pressure taps 7 diameters ahead of the fitting and the downstream pressure taps, 21 diameters after the fitting, in order to eliminate any interference caused by the fitting. The pressure loss of the straight pipe was then subtracted from the total pressure loss reading, giving the pressure loss of the fitting itself. While it is realized that this is not necessarily the loss *in* the elbow, it does represent the loss due to the elbow.

A simplified correction formula to correct for the variation in density was derived as follows:

The Fanning equation gives

$$h = \frac{fL}{D} \cdot \frac{V_s^2}{2g} \text{ .... } (3)$$

which for a particular case reduces to

$$H = K_1 f V^2 \rho \text{ .... } (4)$$

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*Head, Department of Mechanical Engineering, Queen's University.

**Researcher, Queen's University.

†Assistant Researcher, Queen's University.

[1] Exponent numerals refer to Bibliography.

For presentation at the 59th Annual Meeting of THE AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, Chicago, January 1953.

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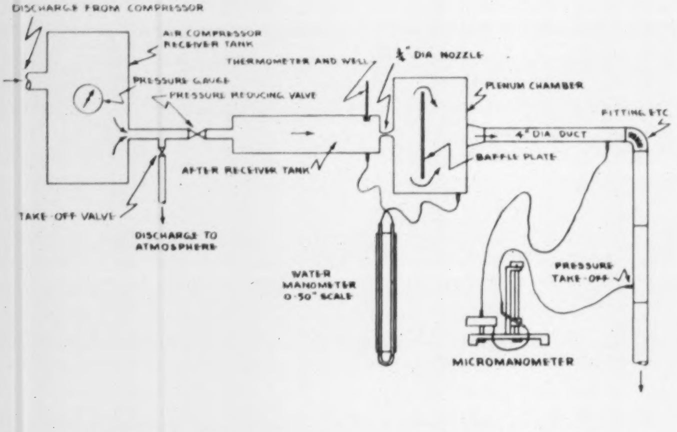


Fig. 1—Schematic drawing showing general arrangement of apparatus used in testing 4-in. diameter air duct and fittings

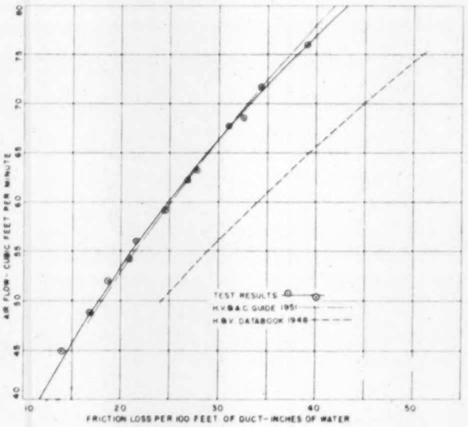


Fig. 2—Friction losses in 4-in. diameter galvanized iron air duct having 40 joints per 100 ft

Nomenclature

w = rate of air flow, pounds per minute.
C = coefficient of discharge, non-dimensional.
D_2 = throat diameter of nozzle, inches.
P_b = barometric pressure, inches of mercury.
$\triangle P$ = differential pressure across nozzle, (inches water gage).
T_2 = absolute temperature upstream from the nozzle, (Fahrenheit, absolute).
H = pressure loss, inches of water.
h = pressure loss, feet of fluid flowing.
V_s = velocity, feet per second.
V = velocity, feet per minute.
f = friction coefficient, non-dimensional.
L = length of pipe, feet.
D = diameter of pipe, feet.
g = acceleration due to gravity, feet per second per second.
ρ = air density, pounds per cubic foot.
ν = kinematic viscosity of air, square feet per second.
d = diameter of pipe, inches.
E = friction loss, equivalent length in feet of pipe.
R/D = ratio of center line radius to the diameter of an elbow.
ζ and a = dimensionless constants.
R_e = Reynold's number, dimensionless.
cfm = air flow, cubic feet per minute.
P_v = velocity pressure, inches water gage.
(cfm)$_s$ = air flow, standard air, cubic feet per minute.

where H is now expressed in inches of water and V is in feet per minute. For air under standard conditions

$$H_s = K_1 f_s V_s^e \rho_s \quad \text{------} (5)$$

therefore

$$\frac{H}{H_s} = \frac{f}{f_s} x \frac{\rho}{\rho_s} x \left(\frac{V}{V_s}\right)^e \quad \text{------} (6)$$

For the same cfm and hence the same velocity

$$\frac{H}{H_s} = \frac{f}{f_s} x \frac{\rho}{\rho_s} \quad \text{------} (7)$$

If the assumption be made that the curve of f against R_e is a straight line on log paper in the small range being discussed, then Equation 7 can be expressed

$$\frac{H}{H_s} = \left(\frac{\nu}{\nu_s}\right)^a x \frac{\rho}{\rho_s} \quad \text{------} (8)$$

By measurement the relationship between f and R_e was determined for the straight 4-in. pipe, and this relationship showed that $a = +0.12$ *therefore*

$$\frac{H}{H_s} = \left(\frac{\nu}{\nu_s}\right)^{+0.12} x \frac{\rho}{\rho_s} \quad \text{------} (9)$$

During the experiments the maximum variation in temperature was ± 5 deg from 73 F. For this variation the kinematic viscosity term could be neglected and H_s then becomes

$$H_s = H \frac{\rho_s}{\rho} \quad \text{------} (10)$$

which is based on a constant cfm.

Results

The results obtained for the pressure loss in 4-in. diameter pipe correspond to the values given in THE GUIDE 1951[2]. (See Fig. 2). From the paper by D. K. Wright and the discussion by R. D. Madison[3] the equation developed to give the pressure drop was

$$\Delta P = 2.74 \frac{L}{d^{1.22}} \left(\frac{V}{1000}\right)^{1.9} \quad \text{------} (11)$$

For the particular case of 4-in. diameter duct, with length 100 ft this reduces to

$$\Delta P = \frac{10.08}{10^5} V^{1.9} \quad \text{------} (12)$$

The equation of the curve developed from the test results in Fig. 2 is

$$H = \frac{11.3}{10^5} V^{1.88} \quad \text{------} (13)$$

The small difference in these equations could be accounted for in the interpretation of the points from the test results.

The description and arrangement of the fittings tested are shown in

Fig. 3. The resistance of the fittings is expressed in terms of the number of velocity pressures lost and also as equivalent feet of straight pipe. These values are also given in Fig. 3. The curves showing the exact losses at various air flow rates are given in Fig. 4.

To facilitate the reading of the curves the actual points showing the results of individual tests were not shown in Fig. 4. Fig. 5 was plotted showing the actual points and illustrates the *scatter* that may be expected when testing different elbows of the same size and shape.

The 4-piece adjustable elbows as received had flakes of galvanizing on the inside at the places where the joints were located. These flakes still adhered to the metal but were protruding slightly, increasing the surface roughness. The results shown in Fig. 5 were obtained by using the elbows as they were received.

The flakes of galvanizing were then removed from the elbows with emery cloth, and the tests were re-run. These test results showed a decrease of 20 percent in the pressure loss value.

An investigation into the effect of rotating the second elbow of a pair of 90 deg elbows was carried out. for both crimped and 4-piece adjustable elbows. The results (see Fig. 6) approximated a sinusoidal variation of pressure loss with angle of rotation.

The equation for the pressure loss in the elbow combination has the form

$$H = K \cos \theta + a \text{ ------------------- } (14)$$

where
K and a are constants.

Knowing the pressure loss with the elbows arranged at any two angles, the constants in Equation 14 can be calculated. The pressure loss for two elbows in combination at any angle can then be found.

The equations calculated from the results obtained and expressed in equivalent feet of pipe are as follows:

For two 90 deg crimped elbows

$$E = 9 \cos \theta + 30.5 \text{ ---------------- } (15)$$

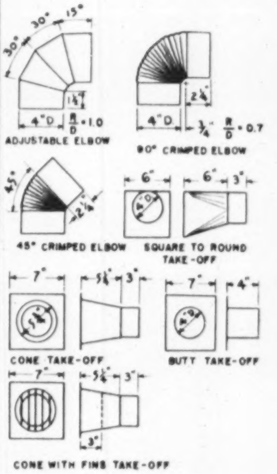
For two 90 deg 4 piece adjustable elbows

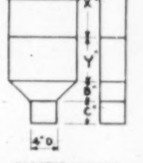
$$E = 6.5 \cos \theta + 19.0 \text{ ---------------- } (16)$$

Further work is required using elbows of various diameters and R/D ratios in order to verify this relationship under other conditions. It is felt, however, that a reasonably accurate pressure loss can be found for two elbows at various angles using an equation of the form of Equation 14.

In the tests run on the registers and register boxes the pressure loss figures include the velocity pressure

	FITTING TESTED	NO. OF FITTINGS TESTED	AVERAGE EQUIVALENT FEET OF DUCT	AVERAGE $K = \frac{LOSS}{V.P.}$	CURVE NO.	A	B	C	X	Y
ADJUSTABLE ELBOWS	90°	5	11	0.92	a					
	45°	3	$7\frac{1}{2}$	0.60	b					
	2-90°	4	$25\frac{1}{2}$	2.16	c					
	2-90°	4	19	1.60	d					
	90°+45°	3	$17\frac{1}{2}$	1.49	e					
	4-45°	1	$31\frac{1}{2}$	2.65	f					
CRIMPED ELBOWS	90°	2	$15\frac{1}{2}$	1.33	g					
	2-45°	1	10	0.82	h					
	45°	2	$6\frac{1}{2}$	0.53	i					
	2-90°	2	$39\frac{1}{2}$	3.33	j					
	2-90°	3	$30\frac{1}{2}$	2.56	k					
	90°+45°	2	23	1.93	l					
	2-45°	1	12	1.01	m					
	4-45°	2	28	2.38	n					
PLENUM TAKE-OFFS	SQUARE TO ROUND	1	5	0.43	α					
	CONE	1	8	0.68	β					
	CONE WITH FINS	1	7	0.59	γ					
	BUTT	1	$13\frac{1}{2}$	1.16	δ					
REGISTERS & BOXES	12 X 6	1	15	1.25	1	12	4	3	10	6
	12 X 6 PLUS ADJ. ELL	1	24	2.01	2	12	4	3	10	6
	10 X 6 PLUS CRIMPED ELL	2	32	2.70	3	10	$9\frac{1}{4}$	$3\frac{1}{4}$	$8\frac{1}{8}$	0
	10 X 6 9" TAPER	1	12	1.00	4	10	$9\frac{1}{4}$	$3\frac{1}{4}$	$8\frac{1}{8}$	0
	10 X 6 9" TAPER ADJ. ELL	2	$17\frac{1}{2}$	1.47	5	10	$9\frac{1}{4}$	$3\frac{1}{4}$	$8\frac{1}{2}$	0
	10 X 6 6" TAPER ADJ. ELL	1	21	1.77	6	10	6	$2\frac{3}{4}$	$8\frac{1}{2}$	0
	10 X 6 3" TAPER ADJ. ELL	1	$28\frac{1}{2}$	2.40	7	10	$3\frac{1}{4}$	$3\frac{1}{4}$	$8\frac{1}{2}$	0





10X6 REGISTER— HORIZONTAL FLEXIBLE FINS WITH SINGLE SHUTTER VALVE. FINS SET AT 22½° DOWNWARD DEFL'N.

12X6 REGISTER— VERTICAL FLEXIBLE FINS WITH MULTIPLE HORIZONTAL SHUTTERS. FINS 22½° SIDEWAYS DEFL'N.

Fig. 3—Friction loss data for 4-in. diameter galvanized iron air duct fittings

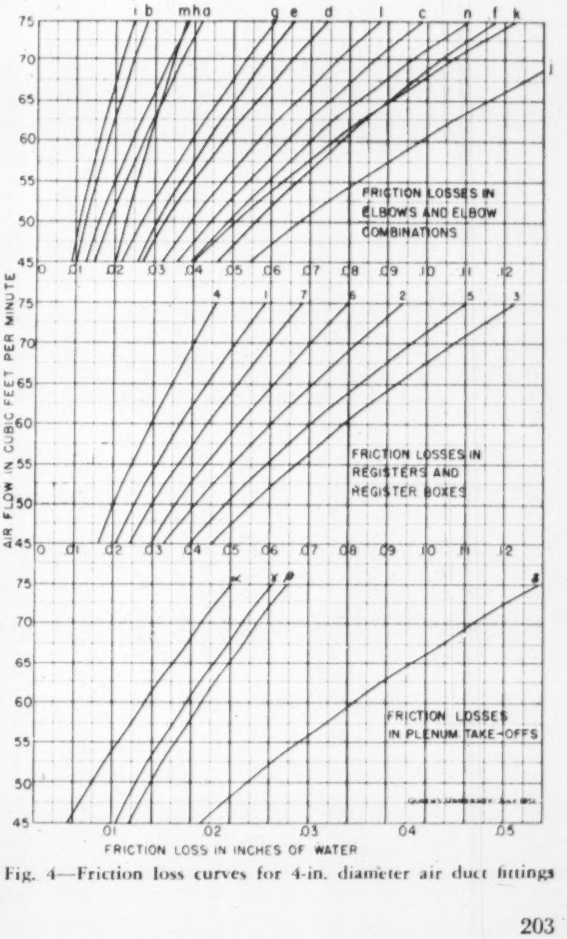


Fig. 4—Friction loss curves for 4-in. diameter air duct fittings

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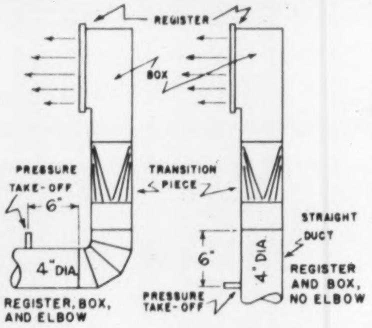
REGISTER
BOX
PRESSURE TAKE-OFF
6"
TRANSITION PIECE
4" DIA
REGISTER, BOX, AND ELBOW
STRAIGHT DUCT
6"
4" DIA
PRESSURE TAKE-OFF
REGISTER AND BOX, NO ELBOW

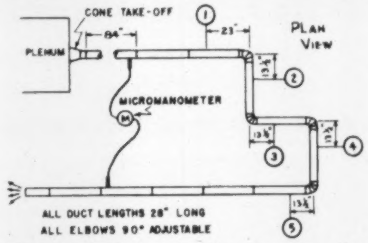
CONE TAKE-OFF
①
PLAN VIEW
PLENUM
84"
23"
②
MICROMANOMETER
③
④
⑤
ALL DUCT LENGTHS 28" LONG
ALL ELBOWS 90° ADJUSTABLE

Fig. 9—Arrangement for impact tube profile test

Fig. 7—Pressure take-off locations for friction loss tests on registers

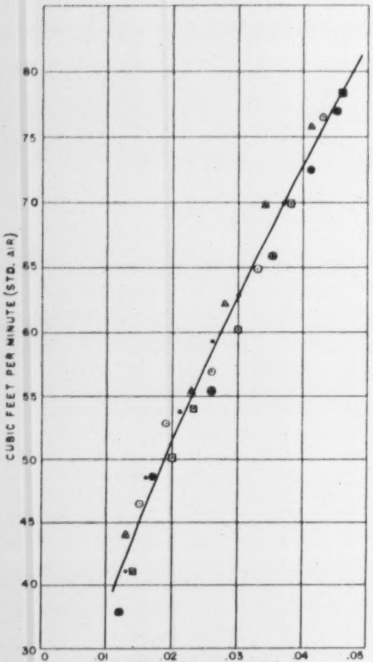

Fig. 5—Mean values of friction losses in 5 different 4-piece adjustable 90-deg elbows

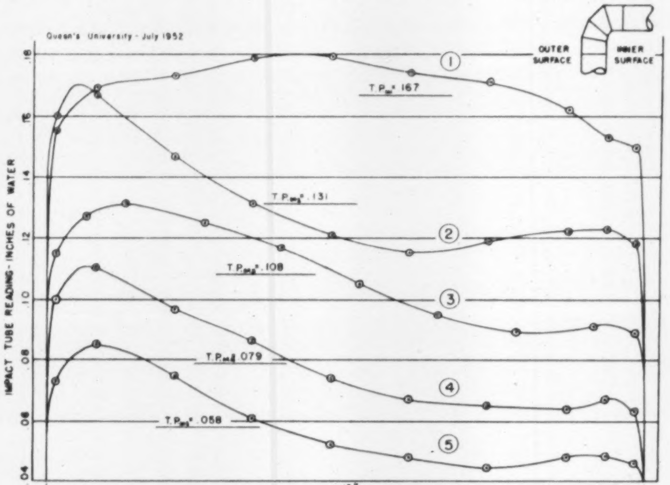

Fig. 8—Total head profiles at 5 positions in the same duct system at 58 cfm air flow

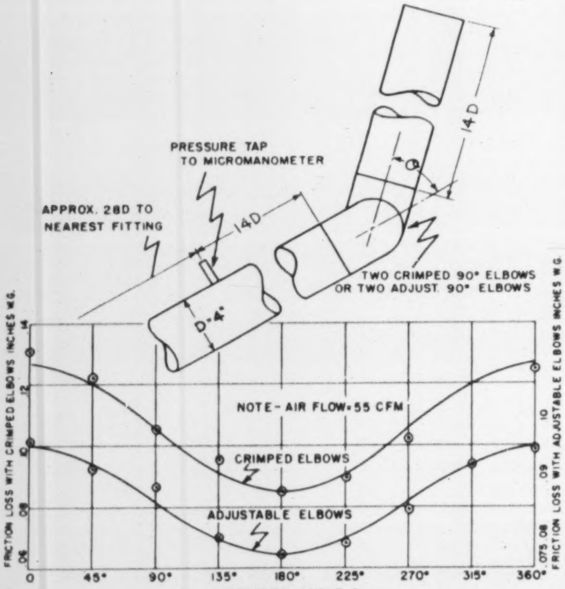

Fig. 6—Sinusoidal loss variations for 2 elbow combinations

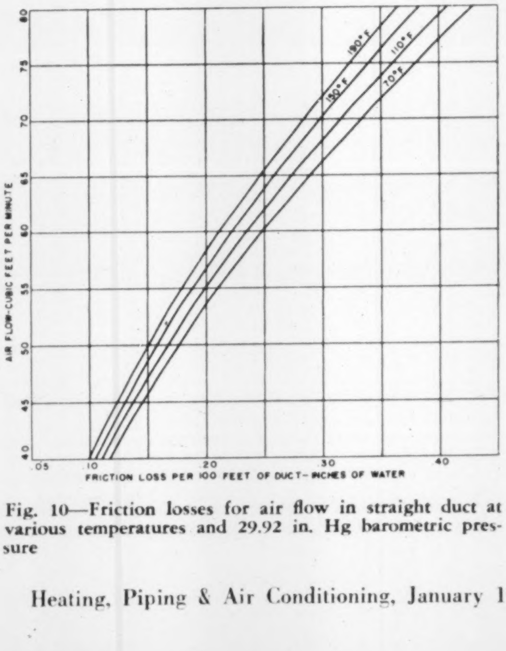

Fig. 10—Friction losses for air flow in straight duct at various temperatures and 29.92 in. Hg barometric pressure

at the register face. These pressure loss values are therefore the sum of the static pressure and the velocity pressure at the point from which the loss is measured. Fig. 7 illustrates the location of the pressure taps in the register tests.

The next investigation was carried out on runs of 4 in. pipe containing several fittings such as elbows and elbow combinations. The purpose was to study the difference, if any, between the pressure loss calculated from the results obtained for each separate fitting and the measured pressure loss on these composite runs. Hereinafter, the pressure loss for a composite run, when calculated as the sum of the losses for the individual fitting and pipe as previously found, will be referred to as the predicted loss.

For 25 composite runs tested it was noted that on the average the measured pressure loss for the run was 10 percent lower than the predicted pressure loss. The maximum variations occurred in runs with less than 15 diameters of straight pipe between fittings. One of these more critical composite runs had a measured pressure loss 30 percent lower than the predicted pressure loss, while another one had the measured loss 10 percent higher than the predicted loss. In the various studies made, no consistent method of predicting the probable variation could be found.

Total pressure profiles were run at various cross-sections along the pipe downstream from elbow combinations in an effort to relate the uneven velocity in the pipe to the variations of the measured from the predicted losses. Five such total pressure profiles are shown in Fig. 8 and the arrangement of the duct is shown in Fig. 9. The numbers on the curves refer to the numbers of the sections as shown in Fig. 9.

Total pressure profiles were run in the horizontal plane only in order to obtain an indication of the velocity distribution rather than a true average of the total pressure over the area of the pipe.

The measured pressure loss between stations 1 and 5, Fig. 9, was 18.8 percent lower than the predicted pressure loss. By the use of a planimeter the difference of the areas under curves 1 and 5 was found and this difference was 19.3 percent lower than the predicted loss which checks closely with the 18.8 percent difference found by measuring the static pressure difference.

A study of the arrangement in Fig. 9, and others, failed to produce a satisfactory explanation of the difference between the measured and predicted losses.

It seems apparent that a future project might be the study of the effect of one fitting on the next succeeding fitting, and others, downstream.

Conclusions

1. The pressure loss in 4-in. diameter pipe as determined in these tests agrees with the values given in THE ASHVE GUIDE[2] in the range tested.

2. A portion of the pressure loss attributed to an elbow occurs in the pipe following the elbow. The pressure loss of an elbow, therefore, depends partially on what fitting or pipe follows that elbow. The pressure loss of an elbow also depends on the velocity distribution in the stream entering the elbow and therefore depends on the fittings immediately before that elbow.

The equivalent length of one of the 4-piece adjustable elbows varied from 5½ ft when used in combination with a register box, to 14½ ft when used in combination with another elbow. The elbow when tested singly had a pressure loss equivalent to 11 ft of pipe.

3. A recent proposal[4] of stating the pressure loss in an elbow in terms of the surface roughness and the *R/D* ratio is unsatisfactory in cases where the elbow has joints or crimps. In these cases it is very difficult to estimate the surface roughness.

4. The pressure loss expressed in equivalent feet of straight pipe is the most satisfactory method of evaluating the loss for a composite run. The actual pressure loss expressed in inches of water can then be found for various temperatures as shown in Fig. 10.

5. When two or more fittings are immediately joined the pressure loss should be evaluated, treating the combination as one single fitting.

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REFRIGERATION AND AIR CONDITIONING STANDARDIZATION PROGRAM OUTLINED

A program to standardize components of refrigeration and air conditioning equipment used by the Department of Defense has been undertaken by the Defense Supply Management Agency of the Department of Defense with the support of the refrigeration industry.

A Munitions Board Industry Advisory Committee, composed of representatives of eleven manufacturers of such equipment selected to reflect a cross-section of the industry by size of company, is collecting data necessary to complete the work. Included on this committee are three Society members. They are Donald French, Carrier Corp.; R. F. Lauer, York Corp.; and J. D. Loveley, Chrysler Corp. In addition, the other eight members of the committee include B. S. Boohner, General Motors Corp.; L. W. Larsen, Tecumseh Products Co.; J. L. Ditzler, Westinghouse Corp.; C. L. Coulter, Lehigh Manufacturing Co.; Clyde Ploeger, Servel, Inc.; Oscar Buschman, Copeland Refrigeration Corp.; Frank Hawk, Brunner Manufacturing Co.; and K. A. Gould, General Machine & Manufacturing Co.

The committee will develop plans for reducing the number of types of refrigeration and air conditioning units used by the three military departments to attain the maximum practicable interchangeability of parts and components.

Ultimate objective of the standardization effort is to simplify spare parts supply and maintenance in order to increase efficiency and effectiveness of military supporting services to combat areas.

A Decade of Progress in ASHVE Research

By I. W. Cotton, Chairman, Committee on Research

The past decade has been a period of marked progress in ASHVE Research. During this time:

The Laboratory was moved from quarters with the Bureau of Mines in Pittsburgh, at first to rented space in Cleveland.

New Staff was recruited, trained and assigned.

The Society later leased, and shortly thereafter purchased outright, its own building favorably situated on a plot of ground (86 x 580 ft) in Cleveland, and the Laboratory was set up in its present location.

By direction of Council the Committee on Research expanded operations to include an increasing number of cooperating institutions with outstanding facilities, for participation in the Society Research activities.

A survey of Membership interest was taken, with a gratifying number responding and indicating desirable fields and subjects for immediate and future programs.

From this survey both current and long range programs were developed by the Committee on Research, approved by Council and inaugurated at the Laboratory and at cooperating Universities.

New Operational Guides for the Committee on Research and the Technical Advisory Committees were drawn up by the Committee on Research, setting up procedures of research organization and operation to conform to the new Society By-Laws.

Technical Advisory Committee membership over the years was strengthened, with increasing numbers of well informed and interested specialists both in and out of the Society, giving freely of their knowledge and time in furthering research accomplishments. Annual research activities have expanded more than 300 percent.

Committee meetings have been streamlined by furnishing all members with outlines of Agenda subjects well in advance of meeting dates, reducing briefing time at the meetings.

A Research Open House was held at the Laboratory in November 1951, marking the substantial completion of important project facilities and displaying research activities.

Closer coordination with other committees — Guide, Standards, Program and Papers, and Publications — is presently being effected with the main objective of getting research data to Society membership more promptly and understandably.

Another Membership survey of research interest is currently in progress and will be a further guide to research scope and activties.

The close of the year 1952 coincides rather remarkably with the conclusion of the extraordinary requirements, other than actual research work, facing the Director of Research and his Staff, the Committee on Research and Council as a result of the Laboratory move and the organization and operation changes made necessary by the new By-Laws. This phase of change and reorganization has been completed in the main, and efforts are concentrated on research as the sole objective by the Technical Advisory Committees, the Committee on Research and the Staff.

It has been my personal privilege as a member and lately as Chairman of the Committee on Research to witness and participate in the latter stages of the developments mentioned, and my faith in Society research facilities and potentials warrants the prediction of constantly increasing usefulness and accomplishment.

At this time with my term as Chairman drawing to a close — my thanks to the membership for having granted me this privilege, sincerely appreciated, and more especially for the outstanding cooperation extended to me by so many sterling members of a wonderful Society.

59th Annual Meeting
of
The American Society of Heating and Ventilating Engineers
and
11th International Heating and
Ventilating Exposition
Chicago, Ill.
See program details, pages 147 to 170.

GREENBERG APPOINTED NEW CITY COMMISSIONER

Dr. Leonard Greenberg, a member of the Society since 1932, was recently sworn in by Mayor Vincent R. Impellitteri as first Commissioner of the city's new Department of Air Pollution. Dr. Greenberg, who had been public health officer in New Haven, Conn., promised there would be no let up in the campaign to rid New York City of smoke and dust.

He is quoted as saying *There is no reason why New Yorkers shouldn't breathe air as clean and pure as that of Pittsburgh*, and he is planning a first hand study of the work done there and in many other cities throughout the United States in regard to the purification of air.

Dr. Greenberg, who was born in New York City, attended Columbia and Yale Universities. At Yale he lectured with the rank of instructor for the Department of Public Health Medical School.

Prior to becoming Commissioner of the Department of Air Pollution, Dr. Greenberg was Director of the Division of Industrial Hygiene for the New York State Department of Labor. He also spent some twenty years working for the United States Public Health Service, and is an acknowledged expert in his field. He is the co-inventor of the standard impinger apparatus for measuring air pollution, and in 1923-24 was in charge of the present air purifying systems in the U.S. House of Representatives and the Senate Chamber.

GENERAL CONTROLS MAKES NEW APPOINTMENTS

J. F. Ray, vice president in charge of sales, General Controls Co., recently announced that B. L. Lerch, formerly Chicago factory branch office manager, has been appointed regional manager for the Middle Western territory. In this capacity, Mr. Lerch will supervise offices in Minneapolis, Milwaukee, St. Louis, Chicago, Indianapolis, Des Moines.

The company has also named Russell Strongman as regional manager, covering factory branch offices in Newark, New York, Hartford and Boston.

E. N. McDonnell to Receive F. Paul Anderson Medal

THE COUNCIL of the Society takes pleasure in announcing the election of Everett N. McDonnell, president of McDonnell & Miller, Inc., Chicago, Ill. for the 1952 award of the F. Paul Anderson Medal "for outstanding work in the field of heating, ventilating and air conditioning."

Formal presentation of the award will be made at the Society's 59th Annual Meeting in Chicago on January 28, 1953, by President Ernest Szekely.

The F. Paul Anderson Medal was established in 1930 by the late Thornton Lewis of Philadelphia, president of the ASHVE in 1929, and named in honor of the late Dean F. Paul Anderson of the University of Kentucky, who served as Society president in 1927.

An outstanding leader in the design and manufacture of safety devices for steam and hot water heating boilers and liquid level controls, and active in many groups concerned with facilities for heating and ventilating, Mr. McDonnell has been a prime influence in the development and expansion of the field. His selection for the F. Paul Anderson Medal is in recognition of his notable scientific achievements and for outstanding services in his chosen field of engineering.

Engineering Career

Mr. McDonnell grew up in Des Moines, Iowa, where he was born on June 25, 1893. While at West Des Moines High School he played left end on the state champion high school football team. He attended Iowa State College, Ames, 1913-16, where he studied mechanical engineering, was president of the freshman class, and played varsity football.

He transferred to Cornell University in 1916, where his studies were interrupted when he joined the Army Corps of Engineers and later went overseas with the A.E.F., as second lieutenant and tank commander, with the 301st Heavy Tank Battalion, during World War I.

On his return to the United States in 1919, he joined the McAlear Manufacturing Company. He had become secretary and director when he resigned in 1924 to form McDonnell & Miller, Inc. In June, 1929, he acquired his partner's interest, and has since been president of the company.

A member of the Society since 1923, he has held many key posts. He served on the Council for eight years, and was on the Guide Publication Committee from 1936 to 1938. He was on the War Service Committee, and since 1939 among his many assignments he has been chairman of the Speakers Bureau, the Research Finance and the Finance and Executive Committees of Council, the Laboratory Housing Committee, which purchased the Cleveland laboratory property, and the Business and Financial Policies Committee. At present he heads the long range Investment Policy Committee and the special Committee on Exposition Rates and Policies.

Mr. McDonnell is a registered professional engineer in the State of Iowa, and is a member of the *American Society of Sanitary Engineers.*

Many Industrial Activities

He is active in a number of industry associations including the *Institute of Boiler and Radiator Manufacturers,* the *Steel Boiler Institute,* the *Stoker Manufacturers Association, Gas Appliance Manufacturers Association,* and *National Electric Manufacturers Association.* A director of the *Oil Heat Institute,* he is treasurer of this group's Old Timers' Club, and a past treasurer of the Plumbing and Heating Industries Bureau. He belongs to the *National Industrial Advertisers Association* and the *National Sales Executive Club,* and serves on the *National Board of Boiler and Pressure Vessel Inspectors.*

Mr. McDonnell's specialized experience was used on a committee which conferred with the *ASME* on safety valve requirements, and on a committee on domestic safety valves, which he headed for the *Manufacturers' Standardization Society.*

He is president of the Everett N. McDonnell Foundation for charity, education and scientific research, is a 32nd Degree Mason and Shriner, belongs to Beta Theta Pi, and is a member of the Tavern Club, Chicago Athletic Club, Evanston Golf Club, and the Lake Geneva Country Club. He was Commodore of the Lake Geneva Yacht Club, and president of the Lake Geneva Property Association.

Eleventh Recipient

Mr. McDonnell will be the eleventh recipient of the F. Paul Anderson Award since the first award was made in 1932 to the late Dr. Willis H. Carrier. Others who have received the medal are Dr. A. C. Willard, Prof. Frank B. Rowley, Dr. F. E. Giesecke, the late Dr. Ferry C. Houghten, Alfred E. Stacey, Jr., the late J. Herbert Walker, Dr. C.-E. A. Winslow, Samuel R. Lewis, and Dr. Homer Addams, New York, charter member of the ASHVE.

The members of the F. Paul Anderson Committee are: Reg F. Taylor, Houston, Prof. C. O. Mackey, Ithaca, N. Y., G. D. Winans, Detroit, M. S. Wunderlich, Minneapolis, A. J. Offner, New York.

JOURNAL SECTION

CHARTER PRESENTED TO SACRAMENTO VALLEY CHAPTER

J. Donald Kroeker, Portland, Ore. (*left*) presenting Sacramento Valley Charter to Pres. L. A. O'Meara

Pres. L. A. O'Meara (*right*) receives gavel from T. J. White, president of Golden Gate Chapter

N. H. Peterson (*right*) presents record book to J. E. Marshall, secretary, Sacramento Valley Chapter

The newly organized chapter met November 5, 1952, at the Capitol Inn, Sacramento, Calif. in a joint meeting with the Golden Gate Chapter from San Francisco. Newly elected President of the Sacramento Valley Chapter, L. A. O'Meara, turned the meeting over to T. J. White, president of the Golden Gate Chapter who introduced the Golden Gate Chapter officers. N. H. Peterson, member of the Society's Council from the Golden Gate Chapter, introduced J. D. Kroeker, Treasurer of the Society and consulting engineer of Portland, Ore., who extended greetings from Pres. Ernest Szekely, Milwaukee. Mr. Kroeker gave an informative address on the history, aims, benefits and responsibilities of the Society. He then presented the Sacramento Valley Chapter Charter to Mr. O'Meara, who, in accepting the charter, stressed to the membership that the benefits of the Society are in direct relationship to its responsibilities and called for all new members to work toward the advancement of the aims of the Society.

Mr. White, president of the Golden Gate Chapter, presented President O'Meara with a gavel appropriately inscribed.

Mr. Peterson made the presentation of the Society record books to the Sacramento Valley Chapter Secretary, J. E. Marshall.

President O'Meara introduced the other officers of the newly organized chapter, E. C. McKinsey, *vice president*: J. E. Marshall, *secretary;* R. A. Sarro, *treasurer;* and N. W. Downs, John E. Day, and D. R.

Method of Choosing Location of, Financing and Conducting Meetings of the Society

Resolved: That inasmuch as the Annual and Semi-Annual Meetings of the Society come under the jurisdiction of the Council, the following rules governing the handling of such meetings be adopted by the Council and published in the JOURNAL of the Society at least twice during every year, preferably just prior to each meeting.

1—The Council will select the city in which the Annual or Semi-Annual Meeting is to be held, giving due consideration to the invitations received from Chapters or members as well as to the advisability of so distributing those meetings as to make them of the greatest advantage to the general membership, and to reduce as far as possible the expense of members attending.

2—That an appropriation be made to cover the entertainment or local expenses, incurred in connection with the meeting, and the regular meeting expenses to be taken care of by the General Fund of the Society in the regular way.

3—That no registration fee or compulsory obligations of any nature be imposed on members or guests.

4—That the purchase of tickets for banquets or for any other form of entertainment that may be provided be entirely voluntary.

5—That the grouping of features and the sale of tickets for group features be discouraged.

6—That the raising of funds from manufacturers of heating apparatus be discouraged.

7—That the display of samples, or of literature, advertising the product of any manufacturer in any way, shape or form, be not permitted at the booths, registration desk, or in or about the meetings.

8—That the distribution of trade papers be entirely at the discretion of the committee in charge.

9—That the local Chapter or local members be empowered to form a General Committee with such sub-committees as may be required to handle the details of transportation, hotel accommodations, entertainment, finance, etc., and that this General Committee be requested to confer frequently with the Council, through the Executive Secretary of the Society, and to make frequent reports on progress in connection with the various matters being handled by them.

10—That the arrangements of elaborate and costly entertainment features be discouraged.

Adopted at Council Meeting, January 29, 1926.

Blanchard, members of the *board of governors*. He then reviewed the short history of the newly organized chapter and expressed gratitude to Secretary Marshall and J. N. Moore, who were instrumental in developing interest in the Society among local engineers. The chapter has 44 members at the present time and more applications pending.

The Program Chairman, E. C. McKinsey, introduced the speaker of the evening Henry Wright, formerly technical editor and managing editor of *Architectural Forum* and consultant to the Herman Nelson Division of the American Air Filter Co., Inc. Mr. Wright's talk on *Heating Research at the Laboratory School* described methods and instruments used in evaluating the heating and ventilation of four identical classrooms facing in four directions, including the corrective and radiant cooling effects of the classroom windows, direct and diffuse solar heat gain, *Skyshine*, and *effects of slab on grade construction* and peripheral heating. In view of the fact that many of those present were engineers from the State of California Department of Architecture and local engineering offices who are responsible for design of California's extensive building program, the talk proved very interesting. Several concepts advanced by Mr. Wright appear to be in conflict with current heating design in this area and the membership is looking forward to more thought-provoking discourses on this subject.

Attendance at the joint meeting was 154, with about 70 of those present making the 90-mile drive from San Francisco to attend.

PRESIDENT SZEKELY ADDRESSES MASSACHUSETTS CHAPTER

President Szekely's comfort progress remarks amuse appreciative Massachusetts Chapter audience

Ernest Szekely, president of the Society and president of Bayley Blower Co., Milwaukee, was introduced by A. L. Hare. President Szekely, the guest speaker of the evening, chose as his topic, *The ASHVE and Progress in Comfort*. In his talk, President Szekely outlined the history of ASHVE from its beginning to its present status of approximately 8500 members and 51 chapters. He also outlined the structure of the Society, and stressed the high grade of men on our advisory committees.

John Bonner, past president of the Chapter, introduced J. E. Brittain, who spoke on *The Engineer and His Umbrella*. This was a report on the engineer's licensing movement in Massachusetts. Mr. Brittain said a vote had been taken in 1949 which resulted in 2355 votes opposing the law and 1829 in favor of it. Since that time there has been no action in the legislature regarding mandatory registration of engineers. Mr. Brittain said he was in favor of mandatory legislation to promote country-wide uniformity; and that Massachusetts was almost alone in the rejecting of it.

The meeting, which was held on October 21, was called to order by Pres. G. B. Torrens at the MIT Faculty Club, Cambridge. Attendance 49. Attendance ratio 0.40.

NORTH JERSEY CHAPTER ORGANIZED

At the organization meeting on November 18, in the Military Park Hotel, Newark, N. J., members of The American Society of Heating and Ventilating Engineers residing in Northern New Jersey formed the North Jersey Chapter of the Society. Council at its fall meeting authorized the charter upon application of 64 members.

The meeting was the culmination of activities of a temporary Steering Committee of 24 members to provide a stimulus to ASHVE membership and to better serve the more than 160 members residing in this area. This committee with F. H. Faust, manager, Product Planning and Marketing Research Service, Air Conditioning Division, General Electric Co., as chairman; H. P. Morehouse, assistant sales manager, Public Service Electric and Gas Co. as secretary; and W. C. Kruse, Jr., Kruse Engineering Co., as treasurer, held preliminary meetings prior to petitioning the Council for a charter.

P. B. Gordon, member of Council and president of the New York Chapter, addressed the meeting, capably outlining the objectives of the Society, the value of chapter programs, and the functions of the chapter under Society By-Laws. In closing, Mr. Gordon extended greetings and congratulations from the New York Chapter to the new neighbor Chapter of North Jersey.

Following presentation by A. A. Bearman, chairman of the By-Laws Committee, of proposed By-Laws, members in attendance approved them after a brief discussion. O. O. Oaks reported for the nominating committee, and the members elected to office for the initial term to July 1, 1953 are: *President*—F. H. Faust, Bloomfield; *Vice President*—H. M. Patrick, Bernardsville, N. J.; *Secretary*—C. H. Smith, Linden; *Treasurer*—W. C. Kruse, Jr., Newark; *Board of Governors*—E. T. Best, Paterson; M. C. Christesen, Newark; and O. O. Oaks, Somerville.

A. V. Hutchinson, executive secretary of the ASHVE, introduced the newly elected officers and promised all possible cooperation and congratulated the Steering Committee for its efforts in organizing the 52nd Chapter of the Society.

President Faust announced the appointment of the chairmen of four standing committees: *Attendance*—S. H. Nitzberg; *Membership*—G. C. Norman; *Program*—H. M. Patrick; and *Publicity*—M. C. Christesen. He launched an immediate program with the first regular meeting of the Chapter held December 9, and a meeting January 13 for the Charter presentation by a Society officer.

Summary of Chapter Meetings*

• *ARKANSAS*: Various requirements which were being included on new school constructions were discussed in the talk given by Mr. Taylor of the Arkansas State Board of Health, Plumbing Division. He stated that heating, ventilation, electrical and sanitary facilities were frequently inadequate in our schools and that heating, ventilating and electrical plans and specifications must now be submitted to the State authorities for written approval.

The guest speaker, Lewis Smith, C. A. Dunham Co., was introduced by Pres. E. N. Pettit. Mr. Smith gave a comprehensive discussion of the various types of steam heating systems for buildings.

The meeting was held on October 21 at the Albert Pike Hotel, and was called to order by President Pettit.

The newly elected officers who will take over January 1 are: *President*—Herman Cumnock; *Vice President*—R. E. Blaylock; *Secretary*—W. J. Franklin; *Treasurer*—J. L. Brown. Attendance 36. Attendance ratio 0.60.

• *ATLANTA*: G. B. Hightower of the Code Committee reported it is anticipated that the heating and ventilating code for the City of Atlanta will be completed by the end of the year. The meeting took place on October 13 at Manny's Shanty Restaurant and was called to order by Pres. F. A. Player. Reports from various committees were presented after dinner. Attendance 52. Attendance ratio 0.50.

• *BALTIMORE*: At a meeting, held in the Engineer's Club, various committees made their reports.

Pres. E. R. Kent introduced the following guests: Cyril Tasker, director of research of the Society; J. Phillips, J. E. Beard and A. Goldreyer. Mr. Tasker then gave a brief outline of the progress of the research program, and requested that each member return the questionnaire which listed all of the research projects under consideration with an indication of the members' particular interest in each item.

E. S. Berngartt introduced the speaker of the evening, L. N. Hunter, second vice president of the Society and vice president, research, The National Radiator Co., Johnstown, Pa., whose topic was *Rating of Heating Boilers*. In his discussion Mr. Hunter enumerated the advantages of codes and the factors taken into consideration in rating heating boilers, both cast iron and steel for hand firing, and automatic firing. In his talk, which was illustrated by slides, Mr. Hunter reviewed and explained the codes of the *I-B-R*, *S.B.I.* and *A.G.A.* A sprightly question and answer period followed Mr. Hunter's talk. Some of the interesting points brought out by this session were: (1) *S.B.I.* ratings do not include allowance for pickup loads, and *S.B.I.* is considering establishing gross output ratings; (2) codes are being developed for large steel boiler units; (3) the various codes for heating boilers do not apply to package steam generators.

The Chapter elected E. R. Kent as member and H. D. Glaser as alternate member of the Chapter's Conference Committee. Attendance 52. Attendance ratio 0.40.

•*CENTRAL NEW YORK*: The October meeting, which was held at the University Club, Syracuse, N. Y., was named the *honor* meeting by Pres. F. E. Krell. The Chapter was honoring the attendance of Ernest Szekely, President of the Society.

President Szekely, president, Bayley Blower Co., Milwaukee, who was introduced to the membership by W. A. Grant, gave a talk entitled *Fans, Their Design and Application*. In his talk President Szekely included a review of the purpose of fans, kinds of fans, and classifications as to materials used in their manufacture. He also gave a brief history of fan development and the changes in design which had taken place.

The second reason for the *honor* meeting was that L. L. Lewis, who was absent because of an emergency operation, was honored by the presentation of a Life Membership in both the Society and the Central New York Chapter, by Pres. Ernest Szekely.

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*Note: The attendance ratios shown represent the membership attendance divided by the chapter membership. These ratios will be useful as a partial indication of interest shown by local chapter members in various types of subjects programmed by the various chapters and may be useful in deciding on subjects for chapter meetings.

The third reason for this special *honor* meeting was that Miss Margaret Ingels, former chapter secretary, was retiring from active business to her home in Lexington, Ky. Attendance 58. Attendance ratio 0.40.

• *CENTRAL OHIO:* A local member, J. I. Trimble, of Surface Combustion Co. gave a fine talk on the subject of warm air which was related to engineering developments in that field.

R. A. Wilson, treasurer, made a motion that the chapter pay $20.00 per year for the next 10 years to the local engineering group for their promotional work in securing a building for the use of engineering societies in Columbus.

The meeting took place on October 20 at the Fort Hayes Hotel. Members and their guests had a fine dinner, after which various committees reported. Attendance 55. Attendance ratio 0.50.

• *EMPIRE STATE*: R. B. Taylor had the pleasure of introducing as the speaker of the evening, his father, E. A. Taylor whose talk covered a recent tour of the continent, dealing primarily with national parks and power dams. Since Mr. Taylor has crossed the continent several times within the past 40 years, he was qualified to make comparisons of the development of the country as regards roads, power plants and the growth of cities. The membership highly acclaimed the anecdotes with which Mr. Taylor punctuated his speech.

The meeting was called to order by Pres. Harry Horowitz. It was held at the Crossroads Restaurant, Latham Circle, N. Y. Attendance 23.

• *INDIANA*: Program Chairman, J. W. Jackson introduced the speaker of the evening, Robert Kryter, Easterline Angus Co., who presented a most interesting discussion on atomic energy. His talk was in the nature of bringing the members up to date on developments in the atomic energy field since his last talk, which was presented to the group two years ago. After the talk, Mr. Kryter was asked a number of questions, which he answered authoritatively.

C. D. Shields of the Guide Committee reported that he had visited Prof. W. T. Miller at Purdue, who is at present under doctor's care. Mr. Miller is considering a suggestion that he write down some of his vast store of knowledge during this period of enforced leisure, and in order to make his work easier, I. W. Cotton announced he would contribute a wire recorder.

F. S. Pherigo reported for the Chapter's research committee that no records were kept prior to October 1, and that only 6 buildings were recorded during the month of October. He stated that there were a number of problems incident to the project, particularly in training watchmen and maintenance personnel to take readings, but that the committee hopes to have 14 buildings recorded during November.

The October meeting, held at the Construction League Building, was called to order by Pres. J. T. Hardin. In the business meeting which preceded the talk, various committee chairmen made their reports. Attendance 49. Attendance ratio 0.40.

•*IOWA*: The speaker for the evening, Henry Wright, spoke quite fully on the subject of *Fundamentals of School Heating and Ventilating*. Mr. Wright used slides and a test of a Moline school to illustrate his subject. Some of the topics he covered were: (a) *comfort conditions in a classroom;* (b) *theory of classroom heating;* (c) *ventilation required;* (d) *cooling is big problem;* (e) *checks on a satisfactory system*. Mr. Wright also included (1) the need for two way temperature control in modern schools, especially outside air for cooling, and (2) that the architects should appreciate the problem of solar heat gain in their design.

The meeting, which was held on October 14 at the Standard Club, was called to order by Pres. R. H. Schnell. During the business session reports were made by various committees. Attendance 40. Attendance ratio 0.60.

• *KANSAS CITY*: The November meeting, which was held at the Wishbone Restaurant, Kansas City, was called to order by Pres. W. A. Reichow, who acted as moderator. The subject for discussion that evening was *Perimeter Heating*. J. R. Scherrer, Jr., spoke on counter flow furnaces. C. W. Schumacher spoke on perimeter air distribution while C. A. L. Davis spoke on commercial and public building usage of perimeter heating. A question and answer period followed the discussion. Attendance 82. Attendance ratio 0.40.

• *MANITOBA*: The October meeting was held at the Fort Garry Hotel, Winnipeg. At this meeting J. F. Bertram introduced the speaker of the evening, G. R. Fanset, industrial commissioner of the Industrial Development Board of Winnipeg.

Mr. Fanset spoke on the *Winnipeg Industrial and Economical Development Work*. Mr. Fanset used numerous slides to illustrate his talk, which was followed by an open discussion. Attendance 20. Attendance ratio 0.40.

• *MIAMI VALLEY:* At the September meeting, held at Neil's Restaurant, John Schweiger introduced the speaker of the evening, Lt. R. J. Perkins, U.S. Army.

Lt. Perkins presented a very fine color movie and talk on his six months experience in Korea. He told of his flight to Japan on a commercial liner, and that one and a half days later he was in command of an engineering company in Korea. He reported that dead bodies made road construction difficult and that the odors were not pleasant even at 0 F. He explained that the soil is chiefly decomposed granite and very difficult to work for road beds.

Following dinner, Pres. D. L. Bergman reported on the special summer meetings. He stated that the meeting dates set for the rest of the year would be the first Wednesday of each month. Attendance 27. Attendance ratio 0.40.

• *MINNESOTA:* At the October meeting, held in the Robin Hood Room of the Dyckman Hotel, Pres. William Sturm announced that M. S. Wunderlich has for some time been a member of the committee on award for the F. Paul Anderson Award. Mr. Sturm then read a letter from Prof. A. B. Algren stating that the Third Midwestern Conference on Fluid Mechanics is to be held at the University of Minnesota March 23-25, 1953. E. F. Snyder, Jr. made the proposal, which was approved, that the chapter donate $25.00 to help defray expenses of organizing and conducting these meetings and that the Third Midwestern Conference be advised that the chapter will be a sponsoring society.

After the out-of-town guests were introduced, Professor Algren submitted a report that J. E. Haines has been nominated as second vice president of the Society. It was also reported that G. M. Kendrick was appointed chairman of the committee covering attendance at the 59th Annual Meeting in Chicago in January 1953. Attendance 108. Attendance ratio 0.30.

• *NORTH TEXAS*: W. E. Frost introduced the speaker of the evening, Merl Baker, associate professor of mechanical engineering at the University of Kentucky, Lexington.

Dr. Baker's presentation was divided into two principal parts. The first part covered a brief history of the development of the *heat pump* and described its applications and limitations. The varying feasibility of using the three principal types of heat reservoirs (air, water, and earth) was covered in some detail. Dr. Baker used slides to illustrate several interesting installations.

The second part of Dr. Baker's discussion dealt with *panel heating and cooling*. In his opinion, panel cooling is very feasible and possesses a rosy future in usages devoted to the absorption of all or part of the sensible heat load in projects that present a high ratio of sensible heat to total heat. Another major point of interest revolved around the established fact that these devices permit inside design conditions to be modified in such a way that thermal shock is materially lessened.

The following members were elected to serve for the next year: P. N. Vinther—*president;* M. W. Brown—*vice president;* J. A. Ray—*secretary;* H. G. Gregerson—*treasurer;* with R. E. Allison, J. L. Tye and G. H. Meffert serving on the *board of governors.*

The November meeting, which was held at the Melrose Hotel, was called to order by Pres. R. E. Allison. Attendance 79. Attendance ratio 0.40.

• *NORTHERN OHIO:* At the October meeting held in the Allerton Hotel, Cyril Tasker, director of research, introduced to the membership the newest member of the Research Laboratory, M. L. Erickson.

The auditing committee's report revealed that there was a total balance of cash on hand of $675.16.

Mr. Michael Shane, Cleveland Electric Illuminating Co., who spoke on the subject of *Power for Air Conditioning Today and Tomorrow*, was introduced by W. C. Jewett, program chairman.

Mr. Shane gave a very detailed discussion of power generation and its distribution. He also dwelt upon the generation of power by atomic energy sources and spoke on its reaction upon the present methods of generation. Following his discussion, Pres. R. E. Sherman opened the session for questions from the members.

President Sherman called the meeting to order. Various committees made their monthly reports. Attendance 78. Attendance ratio 0.40.

• *NORTHEASTERN OKLAHOMA*: Pres. C. H. Dollmeyer called the October meeting to order at the University of Tulsa Student Activities Building. At this meeting Mr. Dollmeyer urged the members to send in requests for hotel reservations for the Annual Meeting in Chicago, if they had not already done so. W. R. Lee, A. D. Holmes and R. F. Shoemaker, past presidents, were appointed on the nominating committee with W. R. Lee as chairman.

Mr. Dollmeyer introduced the speaker of the evening, Reg F. Taylor, consulting engineer, Houston, and first vice president of the Society, who spoke on the subject *Yesterday, Today and Tomorrow.* Mr. Taylor gave an interesting historical development of the Society, pointing out the many contributions which the Society has made to human comfort. Attendance 33. Attendance ratio 0.60.

• *OTTAWA VALLEY*: G. L. Ostiguy introduced the speaker, F. Walker, engineer at the Ottawa Civic Hospital, who presented a paper entitled *Steam or Hot Water?* He concluded that numerous attempts have been made to analyze this problem but that no definite results are available that would pin-point the correct selection of systems to meet the vast assortment and combinations of conditions and specific requirements encountered in the heating business.

Pres. Bernard Stotesbury called the October meeting to order at the Prescott Hotel. Attendance 21. Attendance ratio 0.70.

• *PACIFIC NORTHWEST*: Vice Pres. H. T. Orebaugh introduced the speaker of the evening, Ray Trowbridge, utilization engineer of the Seattle Gas Co., who gave a concise, factual and very worthwhile talk on problems which may be encountered when and if natural gas is delivered in the Northwest.

J. A. MacDonald was appointed as chairman of the Membership Committee with J. B. Notkin as co-chairman. During the October 1 meeting, held at the Stewart Hotel, Seattle, Past President C. A. Pangborn directed the chair's attention to an established policy that the immediate past president and the president serve on the Puget Sound Engineering Council. It was accordingly decided that R. M. Stern and W. B. Pride would serve, relieving J. D. Sparks and C. A. Pangborn. Attendance 70. Attendance ratio 0.70.

• *PHILADELPHIA:* J. H. Hucker presented the Life Membership Certificate to J. M. Kipe at the October meeting which was held at the Engineers Club, Philadelphia. When the business session was terminated, J. A. Gilbreath, assistant vice president, Servel, Inc., discussed *Heat Activated Air Conditioning*. Attendance 83. Attendance ratio 0.40.

• *PITTSBURGH:* L. S. Maehling, chairman of the Membership Committee, reported two new members in attendance — T. H. Ray, Jr., and N. S. Stake. B. B. Reilly then introduced ten past presidents attending the meeting — H. L. Moore, P. A. Edwards, J. F. S. Collins, Jr., F. C. McIntosh, T. F. Rockwell, L. S. Maehling, H. E. Park, A. F. Nass, A. F. Metzger, and W. D. Simpson.

C. H. Schneider introduced the speaker of the evening, L. N. Hunter, vice president, research, the National Radiator Co., Johnstown, Pa. Mr. Hunter is also second vice president of the Society. Mr. Hunter's subject was *Current Methods of Rating Heating Boilers*. He used slides to illustrate the methods of rating boilers. He also told what must be taken into consideration when rating a boiler: (1) the heating boiler; (2) materials of construction; (3) design; (4) fuel; (5) important factors to consider in rating a boiler; (6) rating codes of boilers — *I-B-R, SBI, AGA, HPACCNA.*

On these six points, Mr. Hunter told what the problems are and how they found the ratings. He spoke on what fuels, capacity, stack temperature, grate area, heating surface, efficiency and draft losses mean in determining the ratings. He said manufacturers were required to test their shortest and longest boiler in each series of sizes. Some boilers have the rating in net load, others in *I-B-R* rating, which includes the net load plus piping load, and then the other rating includes the net load, plus piping loss, plus pickup loss, Mr. Hunter said.

Pres. B. B. Reilly called the November 17 meeting at the Webster Hall Hotel to order. Various committees made reports on their activities. Attendance 63. Attendance ratio 0.30.

• *ROCKY MOUNTAIN:* Immediately following the reading of the minutes, H. L. Wray, program chairman, introduced the speaker of the evening, Paul Atchison, A.I.A. of Denver who spoke on the subject *Architectural Approaches to School Design*. Mr. Atchison's thorough familiarity with the subject, in which he specializes, combined with his informal and interesting manner of presenting his ideas, won hearty approval from all those present.

The November meeting was held at the Albany Hotel, and called to order by Pres. N. H. Brickham. Attendance 41. Attendance ratio 0.60.

• *ST. LOUIS:* L. L. Hamig introduced Charles Landrum, Landrum & Brown, who have been engaged by the City of St. Louis to assist in planning better airport facilities there. At Mr. Hamig's request, Mr. Landrum spoke briefly on the effect advancements in aviation have had on airports, and their needs for the future.

H. C. Sharp then introduced the speaker of the evening, L. F. Collins, Detroit Edison Co., engineer, whose subject of the evening was *The Ten Commandments of Corrosion Engineering in the Industrial Water Field*.

During his discussion Mr. Collins used slides to illustrate samples of corrosion caused by various factors under certain conditions. The graphic presentation of the serious effects of corrosion clearly impressed the members that careful analysis of all the problems involved in a water system was necessary to keep the damage of corrosion at a minimum. Mr. Collins pointed out that one of the best insurance policies against corrosion was to employ the services of a competent corrosion engineer to study the problem at the time the system is being planned. A lively question and answer period followed the talk.

L. F. Collins, Detroit, speaker at St. Louis Chapter Meeting with C. H. Burnap, president of Chapter

The November meeting was called to order by Pres. C. H. Burnap at Town Hall. B. L. Evans stated that an item of special interest to all members at this time was the 59th Annual Meeting which will be held in Chicago January 26 through January 29, 1953. Attendance 63. Attendance ratio 0.60.

• *SHREVEPORT:* One of the highlights of this meeting was the election of officers who will serve for the calendar year 1953. The following were elected: *President* — W. S. Evans; *Vice President* — M. A. Hudson; *Secretary* — J. S. Malahy, Jr.; and *Treasurer* — R. S. Segall. The *board of governors* will consist of the above four officers plus C. M. Hadra, C. E. Reed, and R. M. Hood.

The second highlight of the evening was the introduction of Ernest Szekely, president of the Society, and president, Bayley Blower Co., Milwaukee, by R. S. Segall. Mr. Szekely gave a most interesting discussion on *Fans — Their Design, Application and Selection*. His talk, which was illustrated by color slides, was spiced with numerous comments and observations which indicated a tremendous sense of humor and understanding of human nature — particularly that of the engineer.

Mr. Szekely pointed out that fans fall into two basic types which are determined by the direction of air movement through the fans. Generally speaking, he pointed out, *axial* fans are generally limited to static pressure under 2 in. WC, whereas *radial* fans are available in a very wide range of types, speeds and performance characteristics. The biggest detriment to the fan engineer, Mr. Szekely stated, is space limitations for installation of the fan. This also has a great effect on the performance and cost of the fan.

In the conclusion of his talk, Mr. Szekely briefly reviewed the standards set up by the fan industry as to arrangements with reference to the supporting bearings in connection of the drivers, pointing out that rotation is clockwise or counter clockwise when viewed from the driving end, and the various arrangements of the fan with reference to the discharge opening. During the question and answer period which followed the talk, it was brought out that the test procedure adopted by the *National Association of Fan Manufacturers* was identical with that outlined in the Society's HEATING, VENTILATING AND AIR CONDITIONING GUIDE.

The meeting was called to order by Pres. R. M. Hood. Various committee chairmen gave reports on their activities. Attendance 45. Attendance ratio 0.65.

• *SOUTH TEXAS:* R. J. Salinger reported that A. B. Banowsky has been retained by the Blue Flame Council of Houston to spend practically full time on the study of the proposed new code. R. F. Taylor, first vice president of the Society reported he had visited several chapters throughout the southern part of the country.

F. R. Young introduced the speaker of the evening, A. L. Hansen, Vice President, Drayer-Hanson Co., Los Angeles, who spoke on the design and application of heating and cooling coils.

The meeting was held at the Alabama Catering Service, and was called to order by Pres. C. L. Fleming. Attendance 81. Attendance ratio 0.50.

• *SOUTHERN CALIFORNIA:* After the reading of the minutes, Pres. J. S. Earhart announced the appointment of the following standing committees: *Program* — W. J. Biggar, chairman, A. Z. Levine, R. C. Taylor; *Attendance and Reception* — V. J. Burke, chairman, R. W. Thomas, K. D. Simon, G. D. Lord, Carlyle Artran, R. E. Wagner; *Membership* — F. M. Neal, chairman, E. D. Evans, J. R. Hall, R. F. Pyle, R. C. Snow; *Publicity* — J. S. Baragar, chairman, Carl Raymond, A. B. Lang.

An interesting talk was given by R. J. Beaubien, former Lt. J.G.U.S. Navy, on his experiences while on duty off Korea.

W. J. Biggar introduced the principal speaker of the evening, Henry Wright, consultant of the Herman Nelson Division of American Air Filter Co. Mr. Wright gave an instructive talk describing the methods and instruments used in the evaluation of heating and cooling applications at the Laboratory School. Some of the many things which were covered in this discussion were the results of convective and radiant cooling effects of the classroom windows, direct and diffused solar heat gain.

The November dinner meeting was held at the Carolina Pines Restaurant and called to order by Pres. J. S. Earhart. Attendance 54. Attendance ratio 0.20.

• *SOUTHWEST TEXAS:* In the absence of Pres. W. E. Long, and in view of the annual election of officers being scheduled for the November 18 meeting, held at the Penguin Club, San Antonio, Vice Pres. D. E. Locher appointed I. W. Wilke temporary chairman for conducting the meeting. The chapter officers elected for the calendar year 1953 are: D. E. Locher — *president*, L. H. Hornor — *vice president*, and F. B. Frazee — *secretary-treasurer*.

The speaker of the evening, R. W. Patton, chose as his topic *Colorgraphic Supervisory Air Conditioning Control Panels.* Mr. Patton described the inception of colorgraphic supervisory control panels in refineries prior to the war, and mentioned that only within the last year or so have they been used for air conditioning. He said a few of the colorgraphic panel installations which were completed and in progress were at The White House; General Motors Assembly Plant, Arlington, Tex. and in a large Dallas office building. The additional expense of installing such supervisory panels, Mr. Patton said, frequently justified the reduction in operating engineer training time required. In some cases the reduction in time was from one and a half years to as little as a month and a half. Mr. Patton cited a report from the manager of a large Chicago office building which outlined the details and expenses necessary to properly operate a large air conditioning system. It concluded that in many cases, all operating costs considered, the use of colorgraphic supervisory air conditioning control panels could well be a paying proposition.

Mr. Patton illustrated his talk with slides which showed one of the earlier refinery type panels and the White House panel. Control by supervisory panel of a large primary air handling unit using preheat chilled water cooling and re-heat was also illustrated. A brisk question and answer period followed Mr. Patton's talk.

The newly elected Pres. D. E. Locher then opened nominations for two members to serve in addition to the officers on the board of governors. Elected were F. C. Benham and L. S. Pawkett, with W. E. Long as an alternate delegate. Attendance 31. Attendance ratio 0.30.

• *WASHINGTON, D.C.:* G. R. Walz appointed a Nominating Committee consisting of F. M. Thuney and A. S. Gates with S. R. Allen Chairman.

After the meeting was called to order by Pres. G. R. Walz, J. C. Benson introduced the speaker, Ernest Szekely, president of the Society. Mr. Szekely spoke of the Society's interest in its research program, stating that the Society is the only engineering organization engaging in research work and publishing the results. He told of the new Environment Laboratory in Cleveland, for which about $65,000 had been spent on equipment alone, and told of the fine work our people are doing there.

The second half of Mr. Szekely's talk concerned itself with the subject of *Pneumatic Conveying*, the problems involved and the equipment used. Slides were shown and a complete analysis of the problem was presented. The talk was followed by a question and answer period. Attendance 36. Attendance ratio 0.30.

• *WISCONSIN:* E. W. Gifford introduced C. Milton Wilson, sales manager of Anemostat Corp. of America. The subject of Mr. Wilson's talk was *High Velocity Air Distribution* which he opened with the question as to where low velocity stops and high velocity of air distribution starts. He answered these questions by saying that the high pressure system is the use of such high velocity and pressures to obtain reduced duct sizes so that special devices are required to reduce pressure and attenuate the sound at the outlets to a predetermined acceptable value. Mr. Wilson predicted that high velocity systems will materially change the requirements of manufactured equipment and the trade procedures within the next three years.

Mr. Wilson pointed out that the use of high velocity systems presents problems in design to the consulting engineers; one of them being the factor of noise. He also presented a few slides of pictures taken on his recent trip to Alaska.

Pres. J. A. Lofte called the October meeting, which was held at the ESM Bldg., to order after dinner. Attendance 74. Attendance ratio 0.30.

Candidates for Membership

The Society's By-Laws require that all applications for membership or advancement are to be sent to the Executive Secretary and the names of applicants and their references shall be printed in the next issue of the JOURNAL of the Society, or mailed to all members. When the replies are received from references the Candidate's application shall be submitted to and acted upon by the Admission and Advancement Committee as soon as possible.

When the Admission and Advancement Committee has acted favorably upon a Candidate's application and assigned his grade, the Council shall confirm the election of the proposed Candidate for membership. During the past month there have been 100 applications for membership, including 29 student applications and 3 reinstatements; in addition 10 advancements have been received. The names of these men and their sponsors are published in the following list.

Members are requested to scrutinize the list with care. The Admission and Advancement Committee, and in turn, the Council, urge members to assume their share of responsibility of receiving these candidates into membership by advising the Executive Secretary promptly of any whose eligibility for membership is in any way questioned.

All correspondence in regard to such matters is strictly confidential, and is solely for the good of the Society, which it is the duty of every member to promote.

Unless objection is made by some member by January 30, 1953, these candidates will be voted upon by the Council. Those elected to membership will be notified by the Executive Secretary immediately after election.

Note: †Reinstatement. *Non-member. △Advancement.

Arizona

△ CARNS, V. J., Vice Pres., Boyd Industrial Engrg. Co., Inc. Phoenix. REFERENCES: J. E. Haines, A. J. Hess, Fred Kaiser, Benjamin McLain.

Arkansas

△ FRANKLIN, W. J., District Repr., Minneapolis-Honeywell Regulator Co., Little Rock. REFERENCES: Morris Benkovitz, R. E. Blaylock, E. N. Pettit, Jr., T. W. Turner.

† YOUNG, H. M., Jr., District Mgr., Eggelhof Engineers, Inc., Little Rock. REFERENCES: B. T. Bogard*, J. E. Hall*, M. A. Hudson, A. L. Jones.

California

EDINGER, W. J., JR., Sales Engr., Western Asbestos Co., Sacramento. REFERENCES: J. N. Moore, L. A. O'Meara, Arthur Roth, C. E. Wayland.

GIBSON, S. K., Sales Engr., Lemon Grove Sheet Metal Works, Lemon Grove. REFERENCES: William Biggar, M. C. Greiner, W. H. Hermes III, Lee Huntington.

HERSHFIELD, A. A., Engr., C. B. Hodnett & Son, Sacramento. REFERENCES: A. W. Berrier, J. E. Day, T. J. White, Clyde Wilson-Reid.

HUGHES, A. L., Pres., Coldaire Refrigeration Co., Sacramento. REFERENCES: J. E. Marshall, R. R. Reece*, K. J. Swaski, Ottis Taylor*.

QUILLEN, M. B., Vice Pres., Fiberglas Engineering & Supply Co., Sacramento. REFERENCES: F. M. Booth, F. D. Corbett*, E. B. Green, L. A. O'Meara.

WILLARD, R. S., Director of Research, Hollywood Testing Laboratories, Los Angeles. REFERENCES; E. C. Evans, J. R. Hall, A. J. Hess, Leo Hungerford.

ZIMMERMAN, ALBERT, Chief Mech. Engr., Daniel, Mann, Johnson & Mendenhall, Los Angeles. REFERENCES: L. J. Helms, C. R. Kidd, R. C. Snow, C. D. Walz.

Colorado

D'AMICO, A. A. Chief Mech. Engr., International Manufacturing Co., Denver. REFERENCES: C. L. Boyer, J. F. Salsburg, R. J. Walker, A. S. Widdowfield.

Connecticut

△LEGNOS, J. P., Cons. Engr., Newington, Conn. REFERENCES: Harold Hayden*, J. A. Macchi, Arthur Rutherford*, I. W. Rutherford*.

△MUELLER, J. F., Cons. Engr., Hartford. REFERENCES: Herman Goldbecker*, M. H. Golden*, E. C. Marsden, A. L. Wasserman.

Delaware

△METZ, R. A., Sales Engr., Minneapolis-Honeywell Regulator Co., Wilmington. REFERENCES: A. H. Koch, C. J. Lubking, A. S. Robinson, J. K. Walters.

Georgia

HOLDEN, GEORGE, JR., Sales Engr., F. E. Baird, Atlanta. REFERENCES: G. B. Hightower, J. J. McLendon, Jr., F. H. Nelson, F. A. Player.

McCLURE, L. R., Sales Engr., F. J. Evans Engrg. Co., Atlanta. REFERENCES: W. F. Applegarth*, T. A. Barrow, D. M. Mills, J. J. Tyson.

Illinois

DAHLQUIST, G. H., Pres., Modern Heating Engineers, Inc., Chicago. REFERENCES: A. H. Blaker, G. W. Bornquist, B. R. Nelson, N. W. Swanson.

JOURNAL SECTION

Pratt, C. O., Sales Engr., W. C. Morse, Chicago. References: H. E. Anderson, J. W. James, H. A. Lockhart, N. W. Swanson.

Riff, C. A., Mech. Designer, Pioneer Service & Engineering Co., Chicago. References: R. D. Anderson, William Goodman, P. J. Marschall, M. F. May.

Rogers, A. J., Pres., Reliable Heating Co., Park Ridge. References: J. W. James, L. J. Potvin, N. W. Swanson, H. G. Swart.

Indiana

Carter, R. F., Service Repr., Servel, Inc., Evansville. References: F. A. Grossman, H. C. Pierce, Norman Sharpe, J. O. Yund.

Forbes, R. F., Special Repr., Indianapolis Power & Light Co., Indianapolis. References: D. J. Angus*, I. W. Cotton, J. T. Davis*, R. R. Mulvihill*.

Kansas

Sullivan, A. P., Sales Engr., Minneapolis-Honeywell Regulator Co., Wichita. References: O. P. Bullock, E. G. Fahnestock, W. F. Ryan, H. D. Speyer.

Kentucky

Aybers, N. M., Engr., American-Standard Research Dept., Louisville. References: F. E. Hanson, Kurt Krafft, J. B. Uhl, Jr., Herwart Werker.

Louisiana

Adams, F. W., Air Cond. Engr., United Gas Corp., Monroe. References: A. M. Bujard*, G. H. Edwards, Jr., L. C. Landry, Jr.*, R. W. Young.

△Burguieres, E. A., Jr., Pres., Ernest Engineering, Inc., New Orleans. References: J. S. Burke, L. V. Busenlener, C. V. Bankston, E. O. Thoman.

Tilton, E. B., Sales Engr., Ernest Engineering, Inc., New Orleans. References: C. V. Bankston, E. A. Burguieres, Jr., J. S. Burke, T. J. Jenny.

Maryland

Mitchell, C. B., Sales Engr., Carrier Div., United Clay & Supply Corp., Baltimore. References: E. L. Crosby, E. J. Dull, R. E. Kent, W. G. Robertson, Jr.

Massachusetts

Peloquin, L. E., Engr., H. E. Whitten Co., Boston. References: D. W. Blair, Harold Cole*, Ray Norman, Norman Shaw.

Michigan

Begg, Donald, Mech. Engrg. Draftsman, Detroit Edison Co., Detroit. References: J. N. Livermore, R. V. B. Martelli, D. F. Robertson, J. H. Shuler.

Wilson, J. E., Project Engr., Mechanical Heat & Cold, Inc., Detroit. References: J. S. Blossom, P. S. Hosman, R. H. Stevens, J. R. Zynda.

Minnesota

Englebretson, J. C., Mech. Engr., Lyman C. Gross, Cons. Engr., Minneapolis. References: G. M. Brown, L. D. Freedland, L. C. Gross, G. M. Kendrick.

Missouri

Connors, E. B., Pres., Windsor Heating & Air Conditioning Co., St. Louis. References: C. J. Baker, E. T. Clucas, G. E. Myers, H. F. Wilson.

†Farber, L. M., Chief Engr., Natkin & Co., Kansas City. References: D. M. Allen, J. G. Barnes, H. E. Gould, R. B. Mason.

Nebraska

Gates, R. N., Sales Engr., D. E. McCulley, Omaha. References: Russell Brandts*, G. W. Colburn, Fred Downs, M. J. Olson.

New Jersey

Fiigon, E. H., Owner, Earle H. Fiigon, Elizabeth. References: E. T. Best, H. M. Patrick, J. H. Smart, R. D. Tutt.

Schryber, E. J., Sales Engr., The H. B. Smith Co., Inc., South Orange. References: H. H. Bond, R. W. Conway, P. H. Oppenheimer, L. E. Seeley.

Zimmer, C. W., Cons. Engr., Springfield. References: W. M. Heebner, H. B. Hedges, A. J. Nesbitt, R. B. Stanger.

New York

Calkins, Bernard, Owner, Calkins & Co., Buffalo. References: G. E. Adema, J. A. Collins, F. A. Moesel, J. J. Yager.

Fusch, O. A., Mech. Engr., Atl. Dist. Corps of Engrs., U.S. Army, New York. References: Robert Hopkins*, George Nichols*, John Otto*, Louis Zingmond*.

Haber, M. A., Designer, Voorhees, Walker, Foley, & Smith, New York. References: Stanley Dicker, W. A. DiGiacomo, R. A. Nyman, Philip Schatkun.

△Mould, H. W., Jr., Chief Laboratory Engr., Fedders-Quigan Corp., New York. References: C. W. Little, R. W. Morgan, R. H. Meyerhans*, L. J. Sahs*.

Nichols, P. F., Jr., Jr. Staff Engr., Corning Glass Works, Corning. References: Roswell Farnham, P. J. Marschall, D. K. Morton*, V. J. Patterson*.

△Pike, Fred, Owner, Empire Blower Co., Rochester. References: Arthur Bond*, Morris Crook*, A. L. Jones, J. McCain*.

Roberts, D. K., Air Cond. Engr., Thermodyne Corp., New York. References: Vincent Arnold*, Bernard Gerb*, Robert Rosenblatt, Al Weiss*.

Rothfeld, D. J., Htg., Vent. & Air Cond. Designer, Sears and Kopf, Cons. Engrs., New York. References: John Anselmo*, R. W. Conway, W. B. Upor*, Abraham Walton*.

Wynne, T. J., Owner, Airite Ventilating Co., New York. References: H. Diamond, G. O. Hilmer, G. W. Metz*, Arthur Ritter.

Zuckerman, R. E., Htg., Vent. & Air Cond. Draftsman, Voorhees, Walker, Foley & Smith, New York. References: Stanley Dicker, W. A. DiGiacomo, Philip Schatkun, Irving Silverman.

North Carolina

Hargrave, G. H., Jr., Vice Pres., Piedmont Supply Co., Hickory. References: C. Z. Adams, P. L. Guest, Jr., W. D. Graham, Jr., R. K. Hunter.

Hogan, O. W., Jr., York Corp., Charlotte. References: M. M. Crout, L. F. Lawrence, Jr., R. O. McGary, F. C. Wood.

Waynick, D. T., Vice Pres., Dixon & Christopher Co., Greensboro. References: W. D. Graham, Jr., J. E. Hart, L. B. Hoffman, S. T. Oliver.

Ohio

Ahart, J. R., Chief Engr., L. O. Warner, Inc., Dayton. References: F. H. Doench, Jr., M. O. Heapy, R. J. Perkins, J. M. Schweiger.

Burkhart, L. G., Repr., Bryant Heater Co., Cleveland. References: Harold Bergman, W. W. Clevenger*, K. T. Davis, William Leonard*.

Kelly, G. D., Repr., McDonnell & Miller, Inc., Cleveland. References: J. W. James, E. N. McDonnell, A. J. Rummel, N. W. Swanson.

Traina, S. F., Asst. Vice Pres., The Ric-Wil Co., Cleveland. References: Harold Bergman, H. R. Canoyer, H. W. Perry, C. W. Wheeler.

Wilson, H. F., Product Application Engr., Herman Nelson Div., American Air Filter Co., Cleveland. References: R. M. Rose, L. C. McClanahan, Sherwood Nassau, R. W. Nelson.

Oklahoma

Saizow, R. E., Engr., Advance Air Conditioning Co., Tulsa. References: V. W. Miles, R. E. Pauling, B. F. Purifoy, R. C. Smith.

Pennsylvania

†Banks, J. B., Repr., Glass Fibers, Inc., Media. References: G. E. Klapper, M. C. Randall*, W. S. Scott, H. D. Wagner*.

Texas

Brentzel, R. J., Sr. Engr., H. E. Bovay, Jr., Cons. Engrs. References: J. W. Holland, D. C. McNeil, J. N. Powell, F. R. Young.

Flannes, A. P., Vice Pres., Southland Supply Co., Inc., Dallas. References: Herman Blum, Jr., H. M. Cunningham, W. E. Frost, G. A. Linskie.

△Hansford, P. L., Engr., Thermal Control Inc., Fort Worth. References: Paul Grinnell*, T. B. Loftus*, L. A. Miller*, W. O. Richey*.

Peterson, E. K., Owner, Thermal Supply, Houston. References: A. T. Dickey, C. L. Fleming, A. J. Natkin, W. J. Way.

Walters, W. K., Sales Engr., Minneapolis-Honeywell Regulator Co., Houston. References: V. A. Kuellmer, M. E. Linn, D. M. Mills, J. L. Powell.

Zainfeld, Reuben, Co-Owner, Ideal Sheet Metal, Inc., Houston. References: S. F. Atlas, A. J. Natkin, M. B. Peiser, R. J. Salinger.

Washington

Sempel, George, Engr., Hurley Engineering Co., Tacoma. References: W. J. Olson, W. B. Pride, C. L. Timpe, R. M. Towne.

Wisconsin

Schulz, F. C., Htg. Engr., York-Wagner Distributors, Inc., Milwaukee. References: E. L. Aken, T. R. Christy, V. P. Hansen, L. C. Plaehn.

Canada

Brodeur, Camille, Repr., Canada Foundries & Forgings Ltd., Montreal. References: J. W. Davidson, A. S. Filiatreault*, Andre Noreau*, G. E. Perras.

Dahl, G. M., Estimator, Fred Welsh & Son, Ltd., Vancouver. References: D. M. Drake, D. W. Thomson, J. C. Thompson, S. W. Welsh.

Davis, W. W., Service Engr., The Bird-Archer Co., Ltd., Ottawa. References: G. L. Ostiguy, W. J. Robinson, E. J. Schoenherr, Bernard Stotesbury.

Dunk, W. G., Mgr., S. A. Armstrong, Ltd., Toronto. References: W. R. Blackhall, Thomas Ferguson, A. T. Jones, William Philip.

Hibberd, L. H., Chief Engr., Hotel Georgia, Vancouver. References: S. C. Gale, R. D. Hale, D. Stewart*, W. Hudson*.

Mould, W. A., Asst. Mgr., English & Mould, Ltd., Toronto. References: J. D. Coates, Ernest Fox, William Philip, J. H. Ross.

Sidler, Joseph, Partner, Mendel, Brasloff, Lassman & Sidler, Montreal. References: R. I. Brasloff, H. B. Cooper, Ralph Grossman, J. C. Hennesey.

Smith, S. C., Engr., Central Mortgage & Housing Corp., Ottawa. References: D. Clark*, C. R. Hamilton, E. J. Schoenherr, Bernard Stotesbury.

Wright, J. E., Field Engr., Canadian Sirocco Co., Ltd., Toronto. References: W. G. Baldwin, W. J. L. McLean, H. R. Roth, G. E. Smith.

England

Mitchell, W. E. D., Asst. to General Mgr., Matthew Hall & Co., Ltd., London. References: A. Jenkins*, S. Kindler, A. C. F. Mackadam*, Charles Porter*.

Egypt

△Ghawi, F. J., Managing Director, Arab Contracting & Trading Co., Cairo. References: W. G. Cannon*, E. Boustani*, J. Gwyn*, S. Shammas*.

New Zealand

Lefebvre, R. L., Engr., Ministry of Works, Wellington. References: A. L. Charles*, D. S. Davison*, R. P. Gulliver*, G. Hackett*.

South Africa

Brink, G. E. P., Sr. Electrical & Mech. Engrg. Asst., Crawford, Lowe & Partners, Johannesburg. References: M. H. P. Allen, C. G. Brink*, C. J. Butterworth*, W. H. Ellis*.

Students

Iowa State College, Ames, Ia. Certified By: J. F. Sandfort.
Hutchison, M. E.

Oregon State College, Corvallis, Ore. Certified By: A. D. Hughes.

Carlson, B. C.
Engdahl, R. A.
Hango, R. H.
Hoye, H. R.
Kalet, Robert

Purdue University, W. Lafayette, Ind. Certified by: F. B. Morse.

Cameron, A. G.
Eubanks, P. T.
Jones, M. A.
Myers, E. A.
Noland, D. E.
Resnick, M. A.
Salzman, F. P. Jr.
Supple, R. G.
Weast, D. L.

University of Detroit, Detroit, Mich. Certified By: J. E. Lay.

Furey, D. R.
Grenier, F. E.
Hammond, J. M.
Hensman, H. G.
Horvath, Robert
Jansen, W. R.
McCook, J. W.
Merchant, L. F.
Nagl, O. E.
Povinelli, L. A.
Povinelli, T. J.
Snyder, H. G.
Vadas, J. F.
York, J. P.

OBITUARIES

JAMES A. DONNELLY
Hancock, Md.

The members of the engineering and heating profession were greatly saddened by the news that James A. Donnelly, Hancock, Md. Life Member and former Treasurer of the Society, and charter member and Vice-President of the New York Chapter (1911-1912) of the Society passed away in his 84th year at the home of his son, Ralph Donnelly at Hancock, Md., on November 8. Mr. Donnelly was active in many professional, fraternal and civic organizations and was a member of *ASME*, *NDHA*, and *NASE*.

Mr. Donnelly was born on November 27, 1868 in Baiting Hollow, L. I., N.Y. He spent years as an estimator and draftsman for heating contractors in New York, Philadelphia and Washington with Gellis & Geoghegan; Francis Bros.; Jellett and Johnson & Morris. Between the years 1895 and 1897, he supervised the drafting and general construction for Smith and Anthony Co., Boston, Mass. In 1897 Mr. Donnelly became associated with the firm of Donnelly and Merritt of New York as a consulting engineer, where he developed the *positive differential system of steam circulation*. During 1911-1919 Mr. Donnelly was president of the Positive Differential Systems Co. After this he was connected with his own firm, the Donnelly Systems Co. until he retired from active business. He was the inventor and developer of the Donnelly Systems which included the use of many devices made under Donnelly patents.

Mr. Donnelly will be remembered by many students of the Brooklyn Polytechnic Institute for his brilliant discussions on *Steam Heating Pipe Systems*. He was also instrumental in the formation of the courses of study on heating offered by the International Correspondence Schools of Scranton, Pa.

From the moment Mr. Donnelly became a member of the Society in 1904, he became an active leader in the Society affairs. He was highly regarded and respected for his forthrightness and his contributions

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toward the forming of the Research Laboratory and the establishment of THE ASHVE GUIDE in 1922. Mr. Donnelly served as Treasurer of the Society from 1912 to 1914. Among his many other duties, Mr. Donnelly served on the following Committees: 1913-1916 Committee On Tests; 1913 On the Board of Governors; 1914 On the Council; and 1916 Represented ASHVE at the *Second Pan-American Scientific Congress;* and in 1926 chairman, Committee on Pipe Sizes.

Besides these, Mr. Donnelly was Chairman of the Committee on Steam and Return Main Sizes.

Many of the papers which were prepared by Mr. Donnelly are now a part of the permanent records in the Transactions of ASHVE. Among them are:

Sizes Of Return Pipes In Steam Heating Apparatus (1906)

Standard Sizes Of Steam Mains (1907)

The Time Element In Heating Apparatus (1912)

Report Of Tests Of Radiator Steam Traps (1913)

Notes On Suggested Formula For Calculating The Necessary Amount Of Radiation For Heating By Hot Water, Particularly All Gas Kitchens, By Hot Water from a Furnace Coil or a Water Heater (1914).

Some Tests On The Heat Of Direct Radiators At Low Differences In Temperatures (1914)

The Establishment of Standard Methods of Proportioning Direct Radiation And Standard Sizes of Steam And Return Mains (1915)

Design And Operation Of Fractional Valves (1916)

Capacities Of Reducing Valves For Steam Heating Systems (1919)

Fractional Distribution In Two-Pipe Gravity Steam Heating Systems (1921 — written in conjunction with A. A. Adler)

Temperature Control By Fractional Distribution Of Steam In Large One- and Two-Pipe Systems (1922).

During his active participation in Society work, Mr. Donnelly visited many of the Society Chapters where he discussed his favorite topic of steam heating and pipe sizing. He had a great affection for the Society and saw it grow from a few hundred members to its present total of 8,500. He contributed much to the advancement of the profession and was always willing to share his knowledge. Mr. Donnelly had a great variety of interests and some of the Society old timers will recall his underslung pipes and the apples that came from his orchards. During later years he operated a summer resort, Largent Inn, in the West Virginia hills.

Mr. Donnelly is survived by two sons, Webster Donnelly of Hartford, Conn., and Ralph Donnelly of Hancock, Md., to whom the members, the Officers and the Council of the Society extend their profound sympathies.

HARRY K. MEAD
Portland, Ore.

Word has been received that Harry K. Mead, a member of the Society since 1939, died on November 12 of a stroke which he had suffered earlier in the day. Mr. Mead, who had attained a reputation of high regard in heating fraternities, was a manufacturer's representative and a heating engineer.

Mr. Mead was born in 1885 in Chiswick, England. In 1897 he emigrated to Canada, and when he was sixteen came to the United States. Before going to Portland he was in the brokerage business in Chicago and Los Angeles. When he first settled in Portland, there were few mechanical engineers and it became necessary for Mr. Mead, although a sales representative for the C. A. Dunham Co., to make layouts for almost every type of job including the heating plans for grade and high schools, theatres, etc.

Mr. Mead was also a member of the *Aero Club* of Oregon, the *National Aeronautic Association* and the *Multnomah Lodge No.* 1 in Oregon. For the past thirty years he has made his home at Jennings Lodge.

Mr. Mead is survived by his widow; two daughters, Mrs. William Lambert and Mrs. Robert Butler; a sister, Mrs. Winifred Davis of Sacramento and five grandchildren to whom the Officers and Council of the Society express their deep sympathy.

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(52 Chapters—1 Special Branch—9 Student Branches)

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● **MONTREAL:** 1936. Hdqrs., Montreal, Que., Canada. Meets, Third Monday. PRESIDENT, W. G. Hole, 7035 Grand Ave. (14). SECRETARY, D. L. Lindsay, 1411 Crescent St. (25).

● **NEBRASKA:** 1940. Hdqrs., Omaha, Neb. Meets, Second Tuesday. PRESIDENT, S. W. Black, 18th & Harney Sts. SECRETARY, H. H. Ulrich, 608 City Hall (2).

● **NEW YORK:** 1911. Hdqrs., New York, N. Y. Meets, Third Monday. PRESIDENT, P. B. Gordon, 222 E. 41st St. (17). SECRETARY, Carl H. Flink, 62 Worth St. (13).

● **NORTH JERSEY:** 1952. Hdqrs., Newark, N. J. Meets, Second Tuesday. PRESIDENT, F. H. Faust, 5 Lawrence St., Bloomfield. SECRETARY, C. H. Smith, 2490 Vreeland Mills Rd., Linden.

● **NORTH TEXAS:** 1938. Hdqrs., Dallas, Tex. Meets, Third Monday. PRESIDENT, P. N. Vinther, 929 Mercantile Securities Bldg. SECRETARY, J. A. Ray, 4411 Belmont Ave. (4).

● **NORTHEASTERN OKLAHOMA:** 1948. Hdqrs., Tulsa, Okla. Meets, Second Tuesday. PRESIDENT, C. H. Dollmeyer, Jr., 1533 N. New Haven Ave. (15). SECRETARY, V. W. Miles, 624 So. Boston Ave., Box 871.

● **NORTHERN OHIO:** 1916. Hdqrs., Cleveland, Ohio. Meets, Second Monday. PRESIDENT, R. E. Sherman, 570 Hanna Bldg. (15). SECRETARY, R. G. Huebscher, 7218 Euclid Ave. (3).

● **NORTHERN PIEDMONT:** 1952. Hdqrs., Greensboro, N.C. PRESIDENT, J. E. Hart, 1001 E. Bessemer Ave. SECRETARY, S. T. Oliver, 3114 Peebles Drive.

● **OKLAHOMA:** 1935. Hdqrs., Oklahoma City, Okla. Meets, Second Monday. PRESIDENT, W. J. Collins, Jr., 1708 Westminster Pl. SECRETARY, F. X. Loeffler, Jr., 1604 N. W. Fifth St.

● **ONTARIO:** 1922. Hdqrs., Toronto, Ont., Canada. Meets, First Monday. PRESIDENT, J. H. Ross, 1251 Yonge St. SECRETARY, H. R. Roth, 57 Bloor St., W.

● **OREGON:** 1939. Hdqrs., Portland, Ore. Meets, Thursday after First Tuesday. PRESIDENT, K. H. Hanson, 104 S.E. Seventh (14). SECRETARY, W. R. Norte, 2225 N.E. Broadway (12).

● **OTTAWA VALLEY:** 1952. Hdqrs., Ottawa, Ont., Canada. PRESIDENT, Bernard Stotesbury, 955 Somerset St. W. SECRETARY, E. J. Schoenherr, 32 Clarey Ave. (1).

● **PACIFIC NORTHWEST:** 1928. Hdqrs., Seattle, Wash. Meets, Second Tuesday. PRESIDENT, W. B. Pride, 3111 Dose Ter. (44). SECRETARY, I. L. Winsor, P.O. Box 7077, Riverton Hgts. Br. (88).

● **PHILADELPHIA:** 1916. Hdqrs., Philadelphia, Pa. Meets, Second Thursday. PRESIDENT, M. E. Barnard, 12 S. 12th St. (7). SECRETARY, C. J. Lubking, 5060 Wayne Ave.

● **PITTSBURGH:** 1919. Hdqrs., Pittsburgh, Pa. Meets, Third Monday. PRESIDENT, B. B. Reilly, Fifth & Liberty Aves. (22). SECRETARY, E. H. Riesmeyer, Jr., 231-33 Water St. (22).

● **ROCKY MOUNTAIN:** 1944. Hdqrs., Denver, Colo. Meets, First Wednesday. PRESIDENT, N. H. Brickham, 2715 S. Humboldt St. (10). SECRETARY, A. S. Widdowfield, 1925 Blake St. (2).

● **SACRAMENTO VALLEY:** 1952. Hdqrs. Sacramento, Calif. PRESIDENT, L. A. O'Meara, 1400 Tenth St. SECRETARY, J. E. Marshall, 441 Pico Way (19).

● **ST. LOUIS:** 1918. Hdqrs., St. Louis, Mo. Meets, Second Tuesday. PRESIDENT, C. H. Burnap, 235 Keruish Pl., Webster Groves (19). SECRETARY, J. F. Naylor, Jr., 2335 S. Grand Ave. (4).

● **SHREVEPORT:** 1948. Hdqrs., Shreveport, La. Meets, Third Thursday. PRESIDENT, W. S. Evans, 614 Johnson Bldg. SECRETARY, J. S. Malahy, Jr., 1839 Line Ave.

● **SOUTH TEXAS:** 1938. Hdqrs., Houston, Tex. Meets, Third Friday. PRESIDENT, C. L. Fleming, 809 M. & M. Bldg. SECRETARY, J. W. Holland, 245 Esperson Bldg. (2).

● **SOUTHERN CALIFORNIA:** 1930. Hdqrs., Los Angeles, Calif. Meets, First Tuesday. PRESIDENT, J. S. Earhart, 2734 Fleur Dr., San Marino (9). SECRETARY, C. D. Walz, 3600 San Pasqual St., Pasadena (10).

● **SOUTHERN PIEDMONT:** 1952. Hdqrs., Charlotte, N.C. PRESIDENT, R. M. Warren, Jr., P.O. Box 1755, Charlotte. SECRETARY, J. A. Rice, P.O. Box 1755, Charlotte.

● **SOUTHWEST TEXAS:** 1946. Hdqrs., San Antonio, Tex. Meets, Third Tuesday. PRESIDENT, D. E. Locher, Box 949, Corpus Christi. SECRETARY, F. B. Frazee, 1013 Riverside Dr., Austin.

● **UTAH: 1944.** Hdqrs., Salt Lake City, Utah. Meets, Third Thursday. PRESIDENT, D. R. Wilde, 2634 S. 19th E. (1). SECRETARY, Alfred Richeda, P.O. Box 479 (9).

● **VIRGINIA:** 1946. Hdqrs., Norfolk, Va. Meets, Third Wednesday. PRESIDENT, D. F. Phillips, P. O. Box 674, Newport News. SECRETARY, H. E. Marquart, 111 W. Main St. (10).

● **WASHINGTON, D. C.:** 1935. Hdqrs., Washington, D. C. Meets, Second Wednesday. PRESIDENT, G. R. Walz, 5214 25th Pl. N., Arlington (7) Va. SECRETARY, W. C. Reamy, Jr., 17th & Pennsylvania Ave., N.W. (6).

● **WESTERN MICHIGAN:** 1931. Hdqrs., Grand Rapids, Mich. Meets, Second Monday. PRESIDENT, H. R. Limbacher, 760 E. Vine St., Kalamazoo. SECRETARY, F. K. Platt, P.O. Box 307, Kalamazoo.

● **WESTERN NEW YORK:** 1919. Hdqrs., Buffalo, N. Y. Meets, Second Monday. PRESIDENT, J. M. Quackenbush, 505 Franklin St. (2). SECRETARY, Q. P. Thompson, 360 Richmond Ave. (22).

● **WISCONSIN:** 1922. Hdqrs., Milwaukee, Wis. Meets, Third Monday. PRESIDENT, J. A. Lofte, 2505 N. 97th St., Wauwatosa (10). SECRETARY, I. J. Rossiter, 231 W. Wisconsin (3).

SPECIAL BRANCH

● **SWISS:** 1952. Hdqrs., Zurich, Switzerland. PRESIDENT, Leo de Bruyn, Muhlebachstr, 172 ,Zurich. SECRETARY, Walter Hausler, Erbstrasse 2, Kusnacht, Zurich.

STUDENT BRANCHES

● **NORTH CAROLINA STATE COLLEGE:** 1948. Hdqrs., Raleigh, N. C. PRESIDENT, Sydney Narvey, 5-B Vetville, State College Station. SECRETARY, E. A. Travis, Jr., P.O. Box 3333, Bagwell Dormitory.

● **OKLAHOMA A. & M. COLLEGE:** 1950. Hdqrs., Stillwater, Okla. PRESIDENT, Stuart Cohen, 513½ Knoblock. SECRETARY, H. G. Rice, 5 Chickasha, Box 417, Vets Village.

● **OREGON STATE COLLEGE:** 1949. Hdqrs., Corvallis, Ore. Meets, First Wednesday after First Tuesday. PRESIDENT, D. W. Blair, 223 W. 15th St. SECRETARY, C. D. Cannon, 404 N. 26th St.

● **PURDUE UNIVERSITY:** 1948. Hdqrs., W. Lafayette, Ind. CHAIRMAN, N. J. Kirch, 922 Highland Ave., Lafayette. SECRETARY, H. F. Allen, Jr., 629 University St.

● **TEXAS A. & M. COLLEGE:** 1946. Hdqrs., College Station. Meets, Second and Fourth Tuesday. PRESIDENT, J. O. Kadel, Box 4054. SECRETARY, W. C. Haggard, Box 5227.

● **UNIVERSITY OF DETROIT:** 1949. Hdqrs., Detroit, Mich. Meets, First Tuesday. PRESIDENT, T. J. Feahney, Jr., 18263 Oak Dr. (21). SECRETARY, W. F. Thull, 18313 New Jersey (19).

● **UNIVERSITY OF KANSAS:** 1949. Hdqrs., Lawrence, Kans. Address mail to Dr. Warren E. Snyder, chairman, Dept. of Mechanical Engineering, University of Kansas.

● **UNIVERSITY OF TEXAS:** 1949. Hdqrs., Austin, Tex. Meets, First and Third Tuesday. PRESIDENT, W. A. Cox, 360-D Deep Eddy Apts. SECRETARY, V. H. Miles, PHP Dorm J.

● **UNIVERSITY OF TORONTO:** 1951. Hdqrs., Toronto, Ont. CHAIRMAN, D. S. Harper, 737 Sammon Ave. SECRETARY, L. S. Mitchell, 88 Lawrence Crescent.

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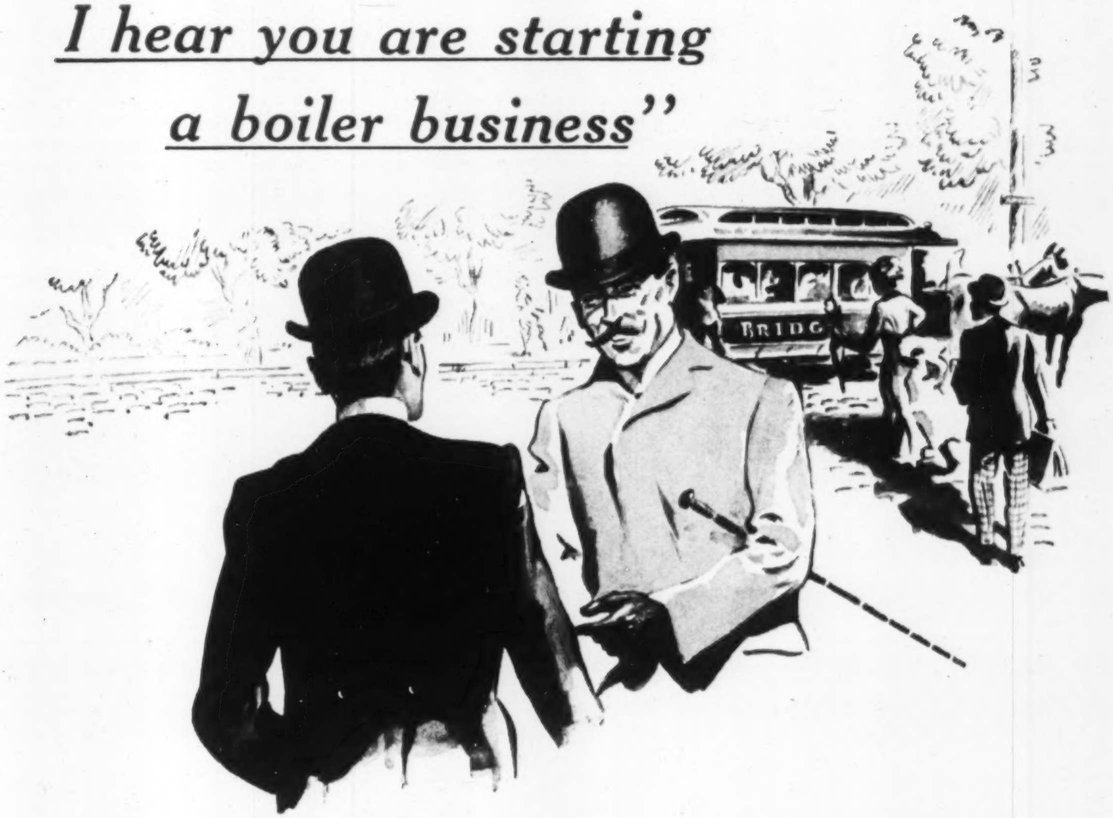

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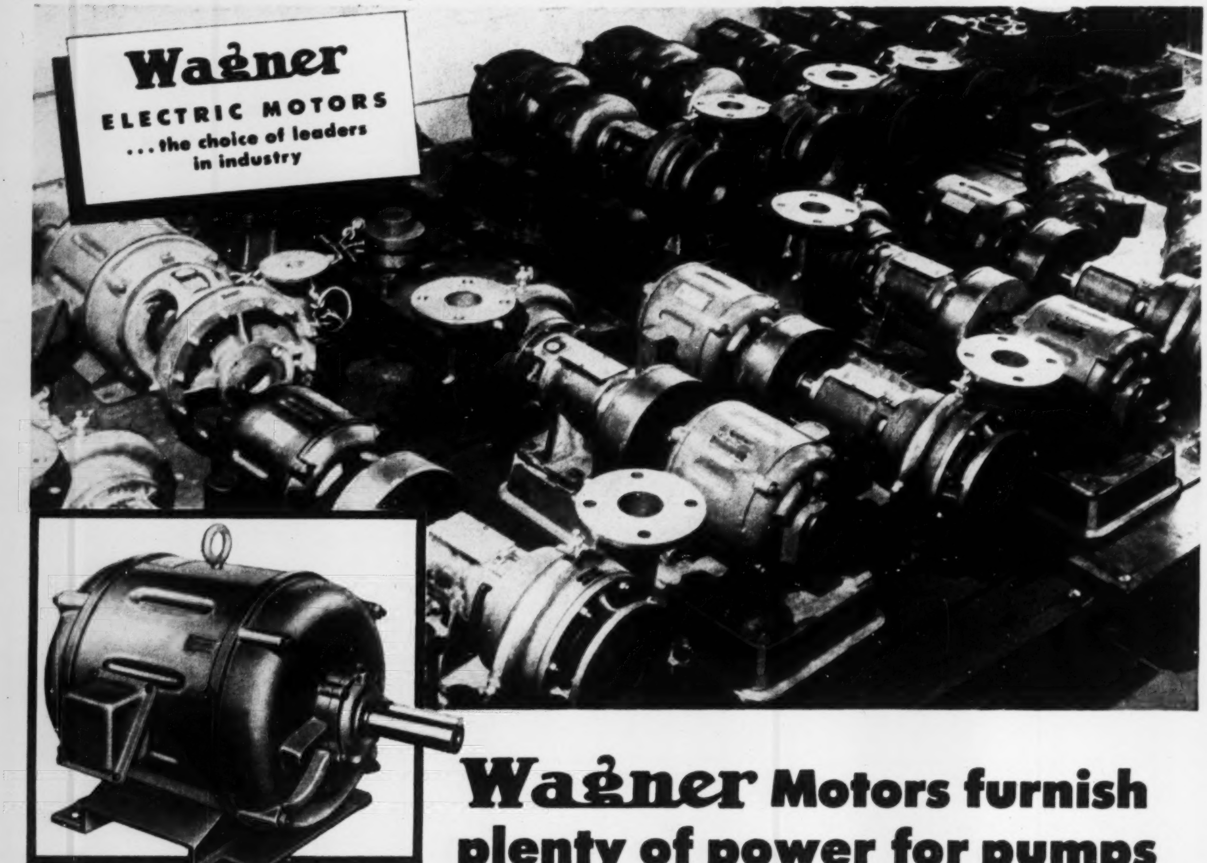

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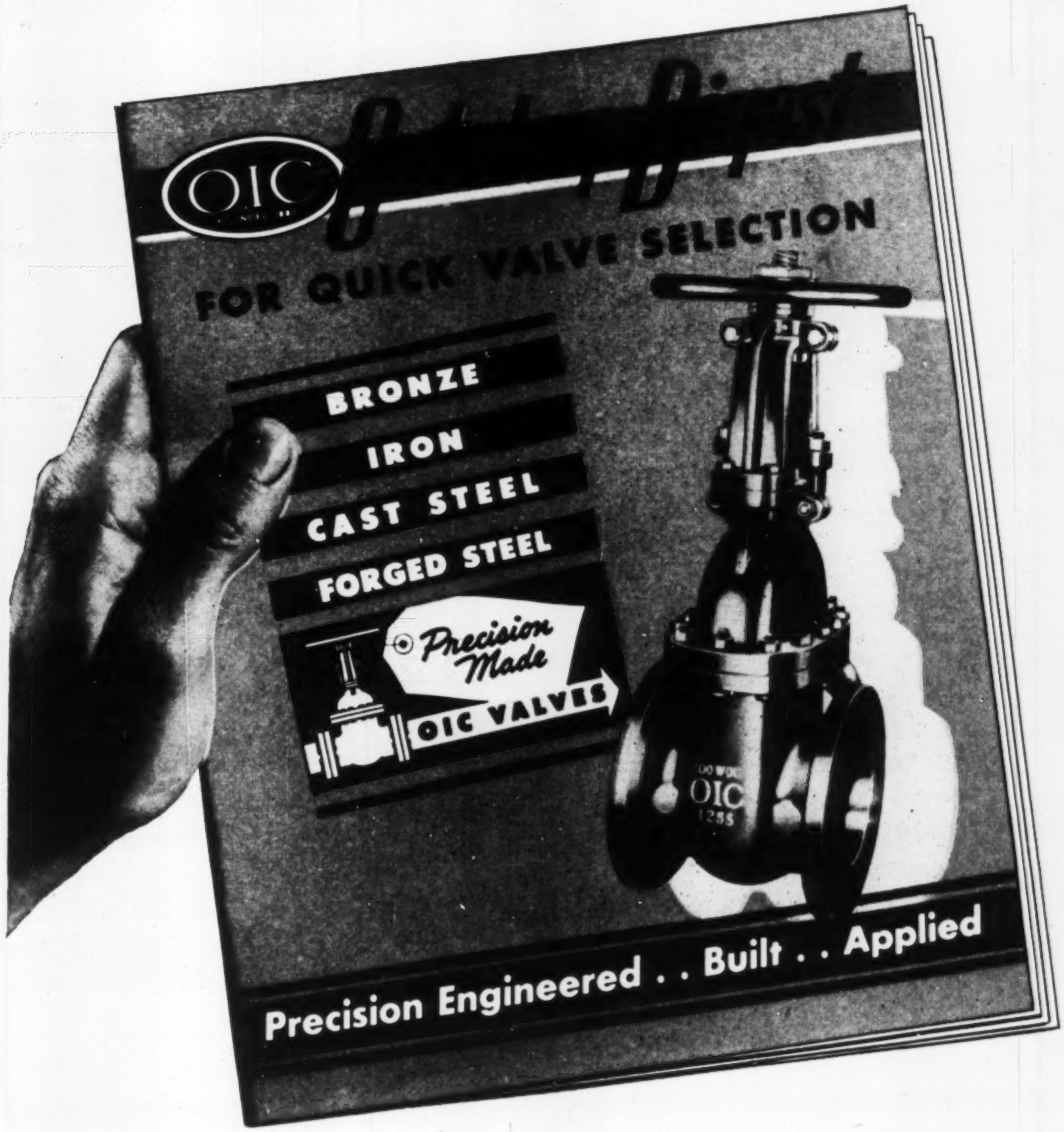
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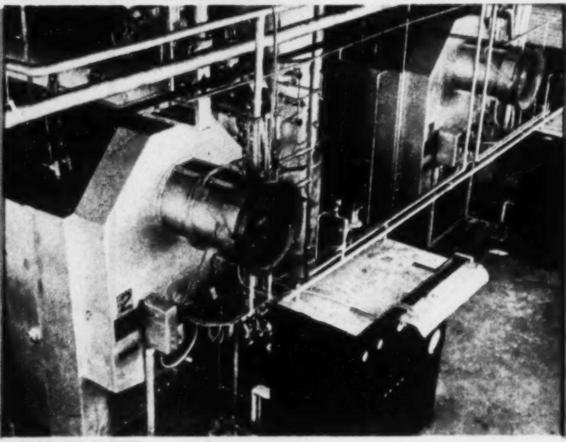

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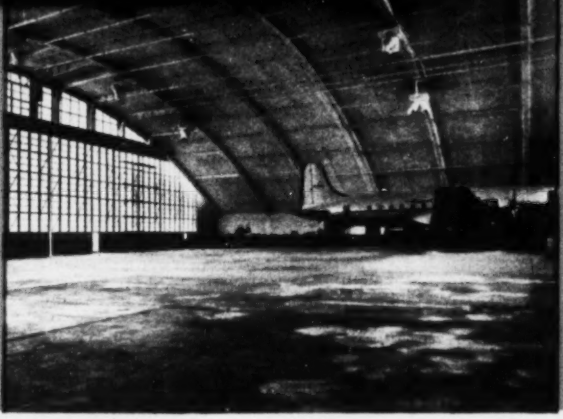

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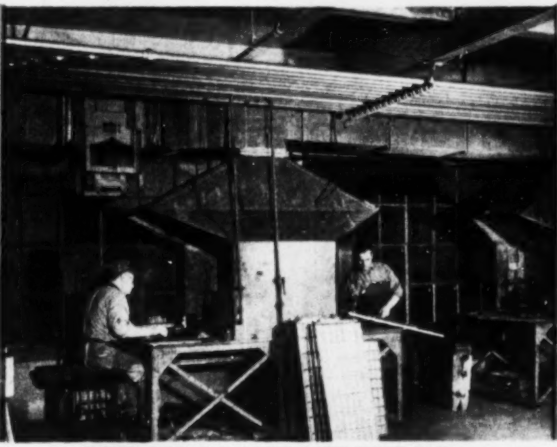
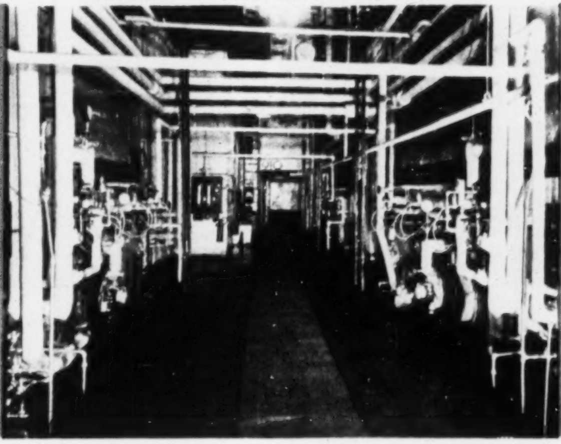
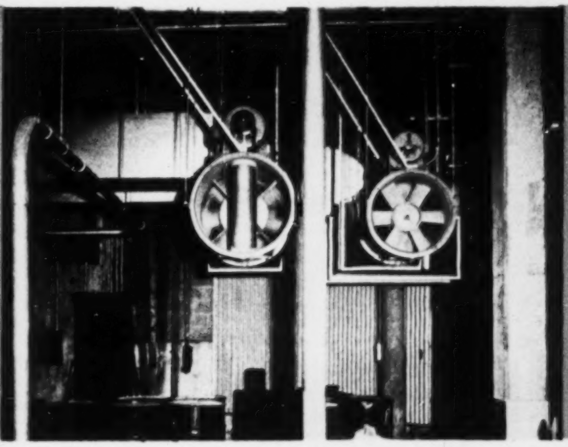


DOUBLE INLET ELBOW TYPE DUCT FAN
IN PLANT OF CHOCOLATE MANUFACTURER

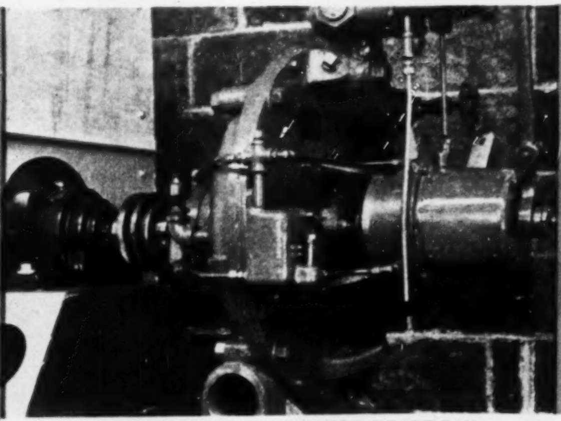
V.T. HEATER SECTIONS IN BATTERY-CHARGING BUILDING



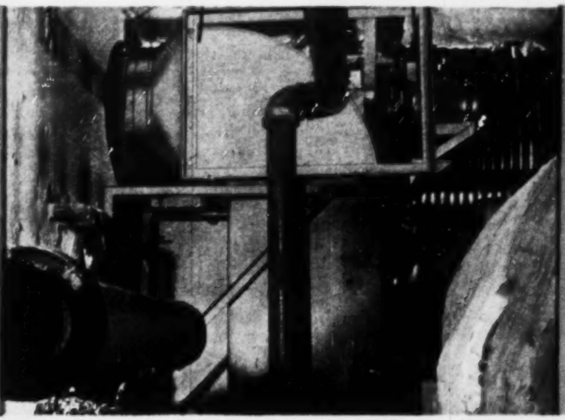
TURBINE BLOWERS IN FIRING AISLE OF LARGE PUBLIC UTILITY



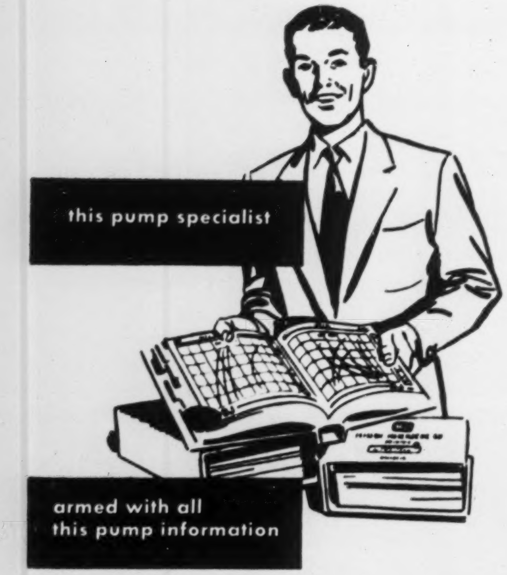
STRAIGHT LINE DUCT FANS CHANGING AIR IN RUBBER FACTORIES



TURBINE OPERATING INDUCED DRAFT FAN
IN PLANT OF LARGE MANUFACTURER



DRAFT INDUCER IN BOILER ROOM OF APARTMENT HOUSE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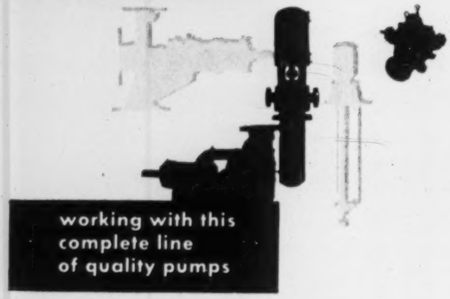
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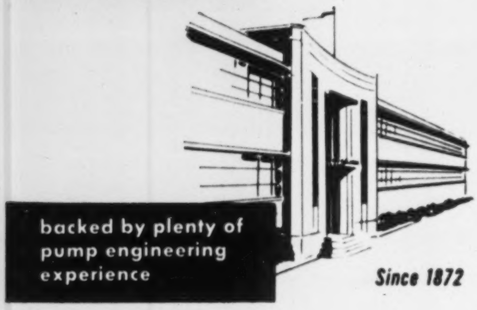
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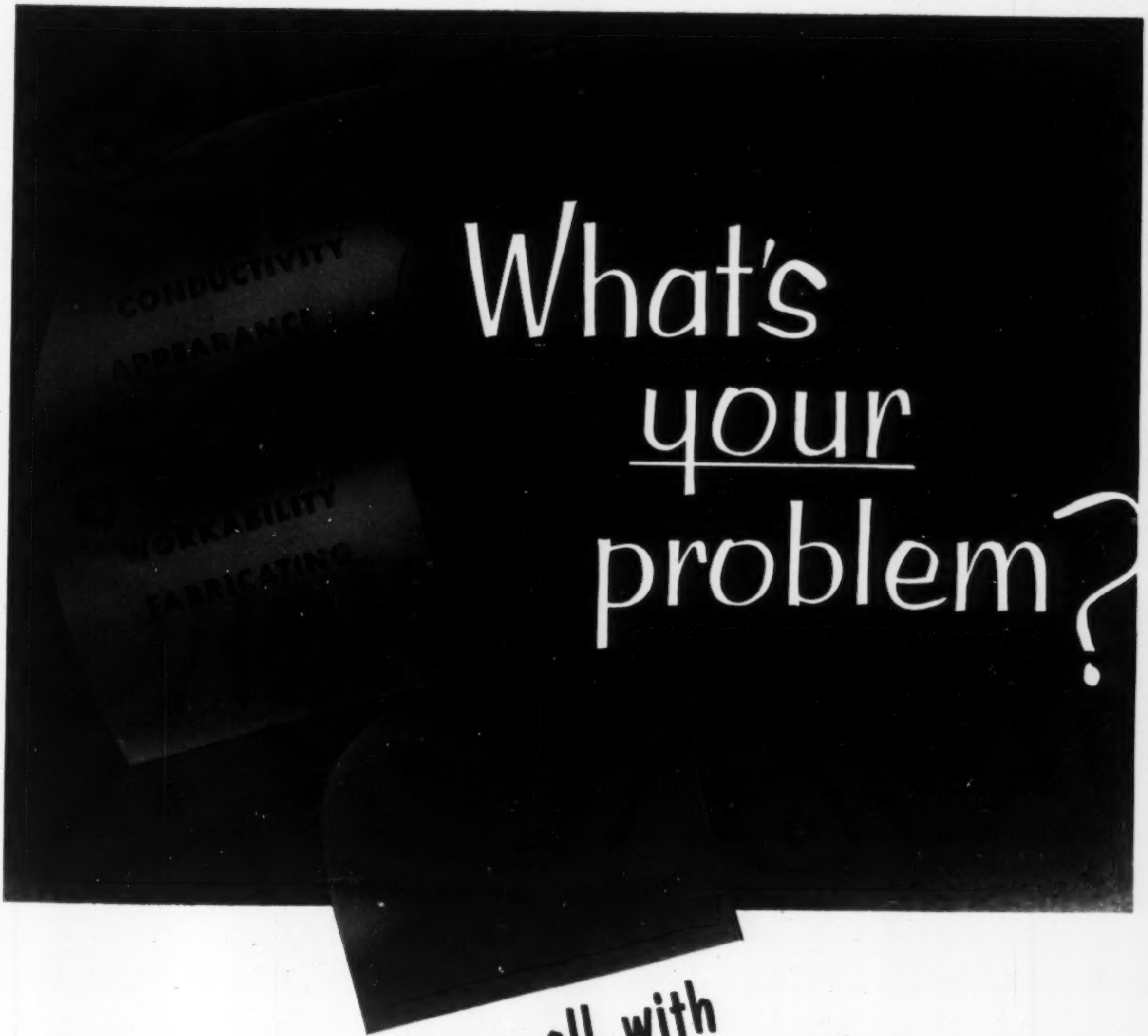
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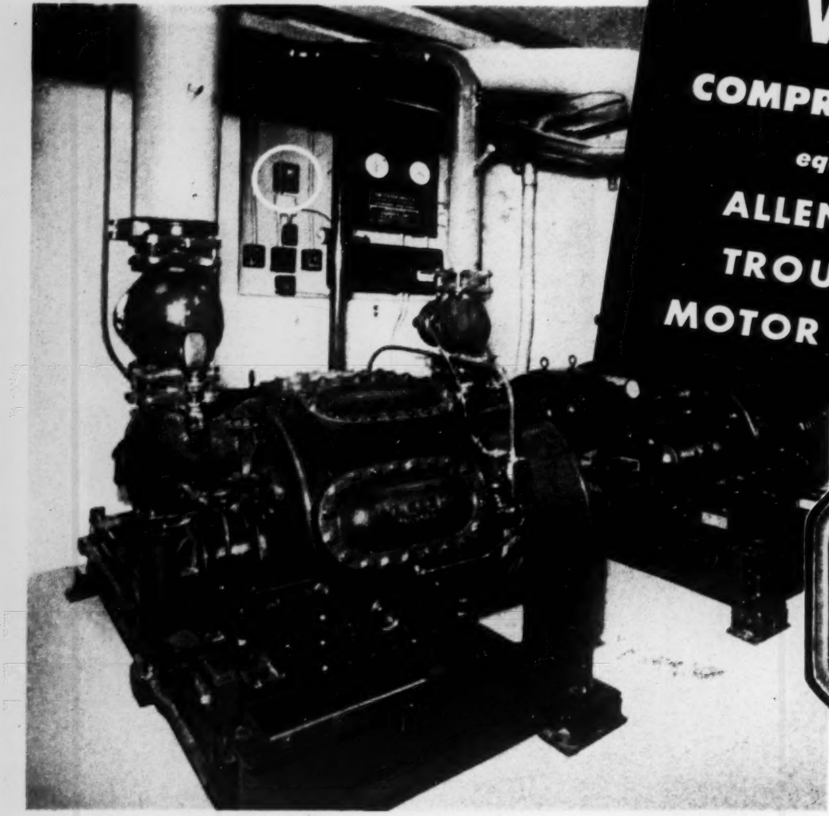

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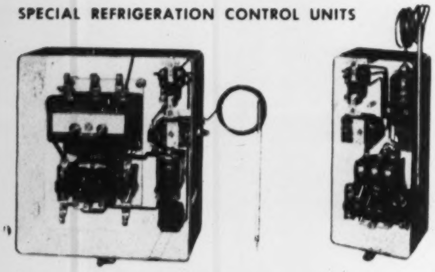

The two units above show Allen-Bradley special refrigeration control units consisting of Solenoid Starter, High Pressure Cutout, Thermostat, and Manual Starting Switch. Size 2 Unit at left, Size 1 Unit at right.

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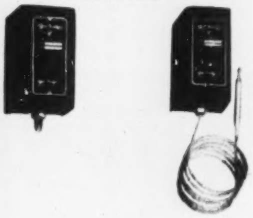

A-B Bulletin 836 Pressure Control and A-B Bulletin 837 Temperature Control. Accurate, rugged, compact units.

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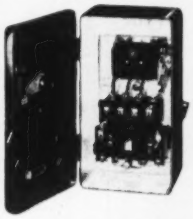
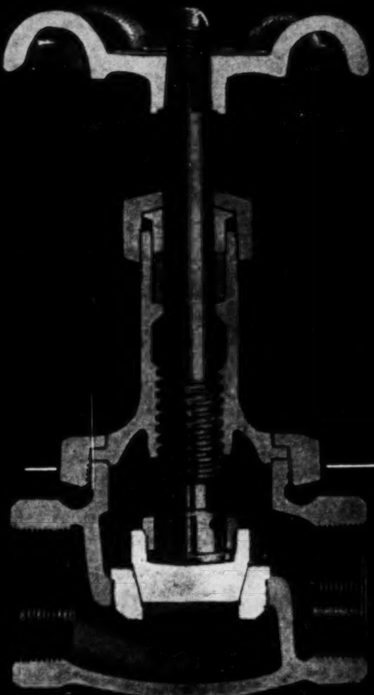
A-B Bulletin 709 Solenoid Starter. Note white interior.

COMBINATION STARTER



A-B Bulletin 712 disconnect switch type combination starter. Saves installation time.

ALLEN-BRADLEY SOLENOID MOTOR CONTROLS



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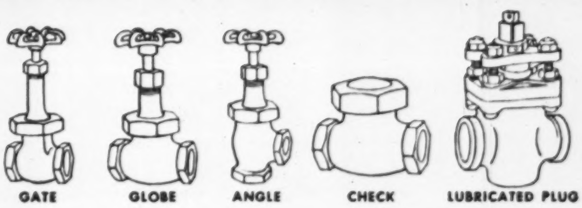
Walworth also manufactures complete lines of valves and fittings — including Lubricated Plug Valves — made of steel, iron, and special alloys as well as bronze.

Walworth-made valves, pipe fittings, and pipe wrenches, total approximately 50,000 items—all sold through distributors in principal centers throughout the world.

Walworth engineers will be glad to help you with your problems. For full information call your local Walworth distributor, nearest Walworth sales office, or write to Walworth Company, General Offices, 60 East 42nd Street, New York 17, N. Y.



Bronze valves in gate, globe, angle, check, and lubricated plug types are manufactured by Walworth. Illustrated is a sectional view of a Walworth No. 225P Bronze Globe Valve. This valve has a working steam pressure rating of 350 psi at 550F (1,000 psi non-shock cold water, oil, and gas pressure). It features a renewable, plug type, stainless steel seat and disc, heat treated to 500 Brinell hardness.

WALWORTH

Manufacturers since 1842

valves . . . pipe fittings . . . pipe wrenches

60 East 42nd Street, New York 17, N. Y.

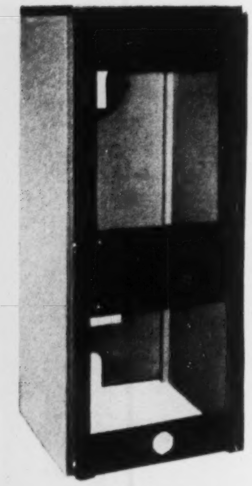
DISTRIBUTORS IN PRINCIPAL CENTERS THROUGHOUT THE WORLD

atlas

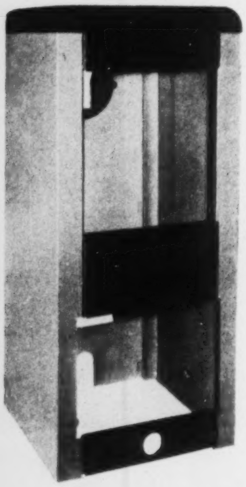
BOILER JACKETS

3

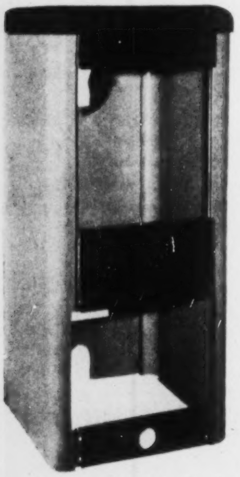
WAY WINNERS



ECONOMY



QUALITY



DE LUXE

ATLAS Boiler Jackets offer three important advantages to the manufacturer:

1. ATLAS special construction and low prices will reduce costs.
2. They will enhance the appearance of your product.
3. Improved product appearance will improve your sales.

ATLAS boiler jackets are custom-built to manufacturers' dimensional specifications. Jackets are of heavy gauge steel, with baked enamel finish and ready to install. No tooling costs are necessary on the three basic styles illustrated. ATLAS flush type boiler jackets are available in three types of construction.

Choose "ECONOMY" square-cornered jackets for cost saving, "QUALITY" with round cornered top for competitive pricing plus appearance, or "DE-LUXE" with fully round corners for your select dealer trade. You'll find any of the three the ultimate in appearance and value.

ATLAS also manufactures cabinets for heating, cooling and air conditioning units. For cost estimates, send specifications and requirements to:

Atlas

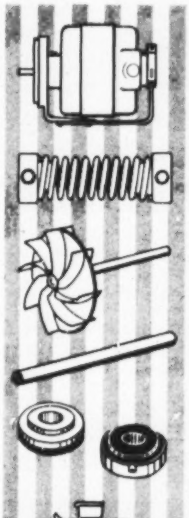
MANUFACTURING COMPANY

EUSTIS AT ROBBINS ST. • ST. PAUL, MINN.

RUGGEDLY BUILT for LOW-COST SERVICE

DESIGNED TO MEET MODERN INSTALLATION, SERVICE AND INVENTORY DEMANDS, TACO CIRCULATORS PROVE TOP DOLLAR VALUE

EXCLUSIVE FEATURES SPELL QUALITY CONSTRUCTION



LARGE POWERFUL MOTOR. Has power to spare. Overload protected and resiliently mounted for quiet operation.

STRONG FLEXIBLE DRIVE SPRING isolates impeller from motor for quiet vibrationless operation.

CAST BALANCED IMPELLER (Not stamped). Casting the impeller in one piece makes certain of long uninterrupted service.

HARDENED GROUND STAINLESS STEEL SHAFT. Made to a plus tolerance of zero and minus tolerance of .0004. Then superfinished for long life smooth operation.

PATENTED ROTARY SEALS. Highest quality rotary seals make for trouble free operation.

POROUS BRONZE BEARING-LARGE OIL RESERVOIR. Long porous bronze bearing lubricates impeller shaft while keeping it in perfect alignment.

Contractors and big users alike are enthusiastic about the new Taco Circulators — and with good reason. This big-value line is specifically designed to meet the needs of the heating market of *today:*

Extra capacity for small pipe radiant heating jobs — radiator, convector, baseboard or panel. Just one size circulator to stock and use — with 3/4″, 1″, 1 1/4″ and 1 1/2″ interchangeable flanges to handle any job.

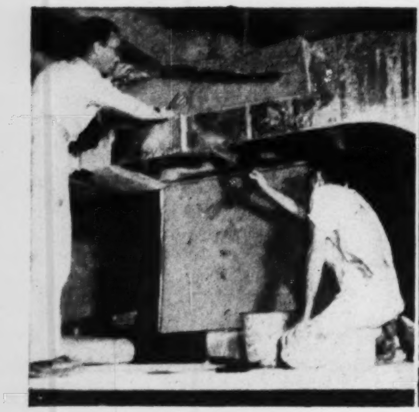
Easy to service — seals replaced with only an open end wrench, screwdriver and Allen set screw wrench. Quiet — no velocity noises regardless of flange size. Designed for six position installation, the new Taco circulator comes in special window carton with flanges individually packed for quick changing.

Better Heating-Better with Taco

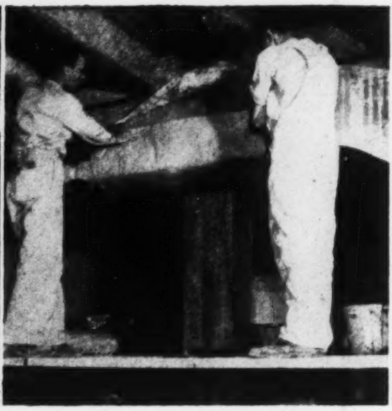
Taco

TACO HEATERS, INCORPORATED, 137 SOUTH STREET, PROVIDENCE 3, R. I.

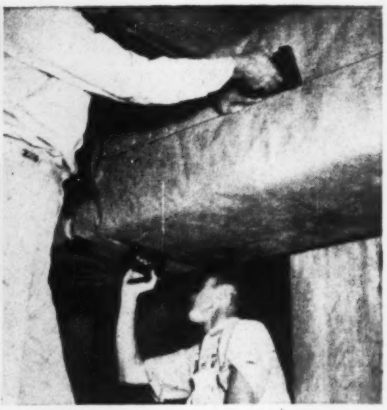
New "Wrap-'n-Staple" method of insulating ducts with ULTRALITE



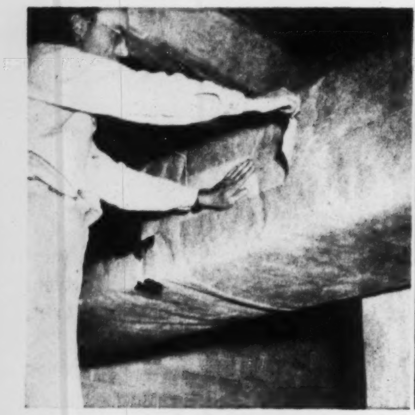
1 ULTRALITE glass fiber insulation, cut-to-size and already faced, hangs over duct. Spot daubing of adhesive helps hold ULTRALITE.



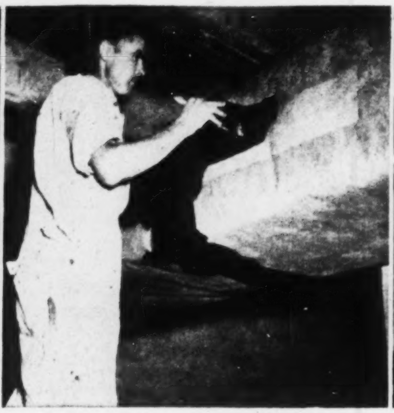
2 Wrapped around duct, ULTRALITE ends overlap. Insulation and vapor barrier facing are separated to form a 4" tab overlap to seal longitudinal joint.



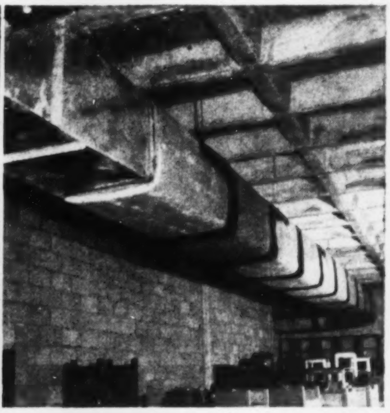
3 Stapling gun converts loose tabs into secure longitudinal seam. Only ULTRALITE has the tensile strength that permits use of staples.*



4 4" strips of standard asbestos furnace paper, painted with wheat paste, are applied over joints. Tapes that match facing are also available.



5 Stripped joints are painted with a coat of waterproof mastic to make certain that vapor condensation will never be a problem.



6 If concealed, duct can be left as-is. If appearance is important, duct can be finished off with muslin or painted with a water-based paint.

Visit our Booth (#543) at the A.S.H.V.E. Show or

Call your ULTRALITE distributor, listed in the Yellow Pages, for details and delivery of ULTRALITE Duct Insulation (thermal) and ULTRALITE Duct Liner (acoustical) . . . today!

*The revolutionary new Bostitch T5-8 "outward clinching" staple gun clinches staples in mid-air. No need to have a clinching anvil or use the duct surface to bend the legs of the staple!

Keeping pace with the Nation's industrial requirements through research and development—since 1898

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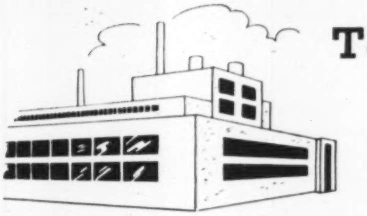


To Large Factories and Warehouses

THIS COMPLETE

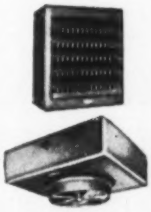
Airtherm

LINE

Gives Heating Satisfaction on Every Job

GAS FIRED UNIT HEATERS

Efficient answer to heating needs in all kinds of commercial, industrial and public buildings where there is no steam supply. Compact, suspended, propellor fan units available from 25,000 BTU to 200,000 BTU. Write for more information.



STEAM UNIT HEATERS
Horizontal and Vertical Discharge

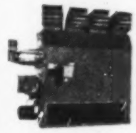
Flexible heating to fit a wide range of requirements in offices, factories, warehouses, stores and public buildings. Horizontal Units available from 18,600 BTU to 270,000 BTU. Vertical Units available from 32,300 BTU to 350,000 BTU. Write for Catalog 1209.

CONVECTORS

Outstanding for easy installation and long, trouble-free service. Clean, uncluttered design blends perfectly into both modern and traditional interiors. Available in a wide range of styles and sizes. Write for Catalog 702-A.

CENTRIFUGAL FAN UNIT HEATERS

Dual Purpose installation for both heating and ventilating can be easily made with this attractively designed unit. Specially desirable for industrial and commercial buildings, schools and auditoriums. Capacities up to 1,440,000 BTU. Available with dampers, filters and non-freeze coils. Write for Catalog 403.



DIRECT FIRED SPACE HEATERS

Self-Contained unit for direct firing with gas or oil or combination gas and oil with instantaneous change over. May be used as both heater and ventilator or heater alone. Comes equipped with motor, burner, heavy-duty combustion chamber, plus all safety devices. Capacities from 650,000 to 2,000,000 BTU. Write for Catalog 802-B.

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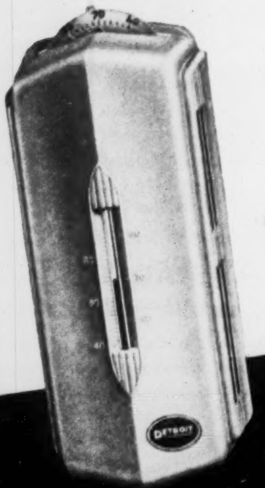
DEAL with DETROIT

and Step-up Your Profits with this

PERFORMANCE PROVEN PACKAGE

DETROIT TIMED CYCLING THERMOSTAT *and* "BI-FLEX" GAS VALVE



DETROIT No. 411-CH Timed Cycling Thermostat

- Timed Cycling—accurate temperature control
- One heater for all jobs
- On the job cycling adjustment
- Easily installed

DETROIT No. V-579 "Bi-flex" Gas Valve

- Quiet operation—at low cost
- Power to open—power to close
- One valve for all gases
- Rugged compact design
- Easy to service

The **DETROIT** *Timed Cycling* Thermostat and "Bi-flex" Gas Valve are superior products which are a natural combination. That's because each product is the last word in performance—*Timed Cycling* for steady pin-point temperature control—"Bi-flex" operation for quiet, efficient and dependable service.

That's why it will pay you big dividends in customer goodwill and extra profits to install these outstanding products on *all* your new installations and modernization jobs. You'll find they make your job simpler because the **DETROIT** *Timed Cycling* Thermostat and "Bi-flex" Gas Valve are designed for quick and easy installation.

Timed Cycling eliminates the need of selecting a special heater, because *one* heater is suitable for all jobs. See your **DETROIT** wholesaler today.

ESTABLISHED AS DETROIT LUBRICATOR COMPANY IN 1877

DETROIT-Controls CORPORATION

5900 TRUMBULL AVE. • DETROIT 8, MICHIGAN • Division of American Radiator & Standard Sanitary Corporation

Representatives in Principal Cities • Canadian Representatives in Montreal, Toronto, Winnipeg—Railway & Engineering Specialties, Ltd.

AUTOMATIC CONTROLS for REFRIGERATION • AIR CONDITIONING • DOMESTIC HEATING • AVIATION TRANSPORTATION • HOME APPLIANCES • INDUSTRIAL USES

Serving home and industry—AMERICAN-STANDARD • AMERICAN BLOWER • CHURCH SEATS & WALL TILE • DETROIT CONTROLS • KEWANEE BOILERS • ROSS HEATER

STEDCO PRODUCTS

71 LEHIGH STREET WILKES-BARRE, PENNA.

Stedco
HIGH HEAT CAPACITY
WITH
Stedco
FIN-TUBE
RADIATION
STEEL OR
ALUMINUM FINS

Stedco radiation is perfect for industrial and commercial heating applications. This same radiation element is standard on all Stedco compact convectors. Stedco radiation is made of 1¼" seamless steel tubing with #22 gauge fins of steel or aluminum. Fins attach mechanically eliminating use of a solder bond for better heat transfer.

Stedco fins interlock in sleeve fashion and completely encase center tube. With aluminum fins this provides a non-corrosive heating element. Stedco construction gives double the contact area between fin and tube for more heat output, assuring greater heating capacity throughout life of element.

The single pipe feature of the STEDCO radiation permits high, safe working pressures up to 150 lbs. adaptable to 2 pipe heating systems. STEDCO units function as well with sub-atmospheric steam as with steam under pressure and provide an unusually high degree of fuel economy and temperature control. Stedco radiation is manufactured in standard sizes, in foot and half-foot lengths up to twelve feet. Standard units are threaded at each end with standard pipe threads unless otherwise ordered. No end fittings or grilles are furnished with radiation but are available for all lengths.

BTU OUTPUT OF STEDCO CONVECTORS

TYPE OF CONVECTOR	Ent. Air	Rad. Ft.	Water 180° F	1 Lb. Steam Standard 215° F	Sq. Ft. EDR
Steel on Steel—with Cabinet	65°	1	1238	1848	7.7
Steel on Steel—Element only	70°	1	1159	1680	7
Aluminum on Steel—with Cabinet	65°	1	1415	2112	8.8
Aluminum on Steel—Element only	70°	1	1325	1920	8

The Stedco Radiation Element has been tested by a nationally known university and the ratings quoted are based on tested engineering data supplied by the university.* Engineering data ratings are based on the standard conditions of 1 lb. steam pressure, 215° steam temperature and 70° room temperature. One lineal foot of STEDCO radiation with steel fins will give 1676 BTU or 7 square feet of EDR per hour. One lineal foot of STEDCO radiation with aluminum fins will give 1930 BTU or 8 square feet of EDR per hour.

**Cabinets (RG Series) add 10% to Radiation output*

University testing laboratory furnished on request.

STEDCO CONVECTOR COVERS . . .

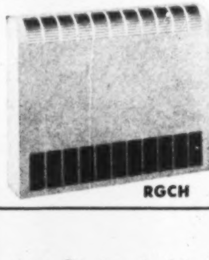
RGOB

Cabinets (RG Series) add 10% to Radiation output

RGBG

RGBS

Panel Front Grille for Recessed Radiation


RGCH

CONVECTORS STEDCO CABINET HEIGHT

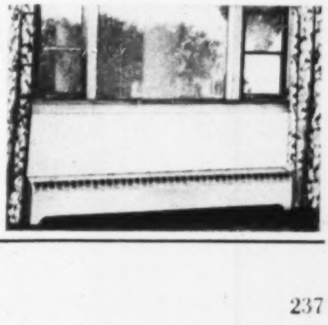
The Stedco RGCH (Round Grille Cabinet Height) convector is manufactured in 20" height for *double tiering* and 30" height for *triple tiering only*. Type RGCH is 4½" wide and is available in standard lengths. Where limited space and radiation output is a problem, let the RGCH convector solve it easily and efficiently.

STEDCO COMPACT CONVECTORS

For Residential, Commercial, Industrial Installations . . .

- **STEDCO GIVES MORE HEAT**
  The high heating capacity of Stedco convector elements means ample capacity for any sized room: fewer feet of radiation required.
- **STEDCO CONSUMES LESS SPACE**
  Only 10¾" high and 4½" wide, Stedco is inconspicuous and does not interfere with room or furniture arrangement.
- **STEDCO COSTS LESS TO INSTALL**
  Stedco high heat capacity means less radiation is required, fewer valves and fittings required. Stedco needs no recessing takes less labor to install, keeps installation costs down.
- **STEDCO MODERN DESIGN COMPACT CONVECTORS**
  Available in several models of compact convector covers or grilles to meet any decorative or architectural design. All Stedco compact convectors use the standard Stedco fin tube radiation element allowing a choice of convector covers on one heating system.
- **STEDCO FOR NEW CONSTRUCTION OR REMODELING**
  Gives the maximum in satisfaction, a wide choice of designs for new construction and the perfect answer for replacing outmoded radiation in remodeling present heating systems.
- **STEDCO ALLOWS MAXIMUM AIR CIRCULATION**
  Will not smudge walls or furnishings.

Note compact, modern design for more attractive appearance.



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COMPLETE
ILLUSTRATED
DATA**

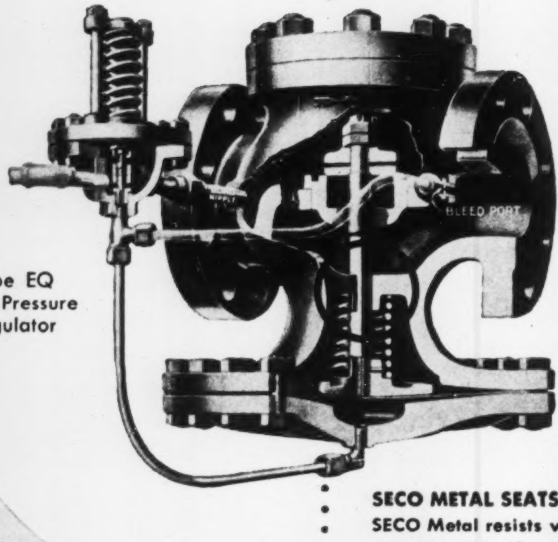
HOW SPENCE DESIGN...

eliminates stuffing boxes

All Spence main valves and most pilots are built without stuffing boxes. This packless construction is made possible by the use of a large balanced metal diaphragm which eliminates the need for closely fitted parts. Result? More accurate regulation.

Valve stem wear is also reduced in the Spence packless design. Result? Low maintenance, years of trouble-free service.

Spence makes a wide line of automatic regulating valves: Pressure, Temperature, Differential Pressure, Back Pressure, Pump Governors and many other types. Write for bulletin 100 giving full details.



Type EQ
Back Pressure
Regulator

A few other design features:

SECO METAL SEATS AND DISCS— Durable SECO Metal resists wiredrawing. More than twenty years of experience in thousands of installations has failed to produce a single case where SECO Metal has been cut by steam.

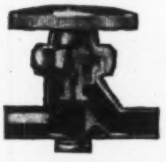
PROTECTED SPRINGS— The internal springs in the Spence Main Valve and Pilot are out of the path of the steam or other fluid flowing through the valve. They operate at low unit stress for exceptionally long life.

METAL DIAPHRAGMS — Located in a cooled zone with a condensate seal above and below, never have to be replaced under normal conditions.

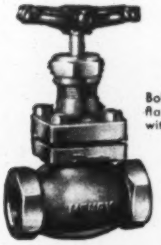
Spence

SPENCE ENGINEERING COMPANY, INC.
WALDEN, NEW YORK

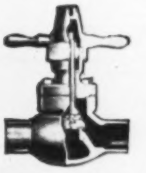
SE 121



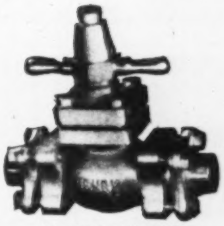
PACKLESS VALVE
With balanced-action



AMMONIA VALVE
Bolted Bonnet — screw or flanged connections. Also with screwed bonnet, sizes 1″ and under



WING CAP VALVE
Non-ferrous



WING CAP VALVE
Semi-steel—with companion flanges and adapters

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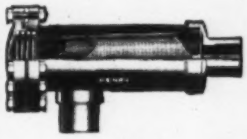
you pay—

no premium for..

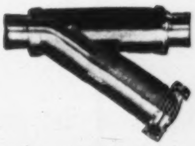
the extra advantages
found in

Henry products

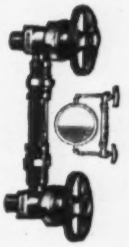
or for the extra satisfaction
that follows their use



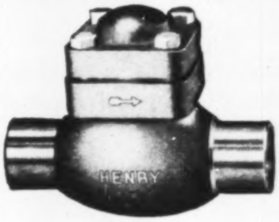
STRAINER
Angle type with patented distortion-proof flange



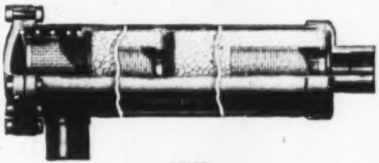
Y-STRAINER
Brass plated. Welded steel construction with forged brass connections. Size ⅝″ O. D. S. through 4⅛″ O. D. S.



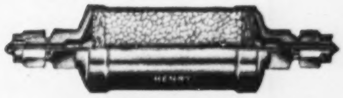
BALANCED-ACTION PACKLESS LIQUID LEVEL GAUGES
Valves are backseating—diaphragms may be inspected or replaced without loss of liquid. Conforms with all safety code requirements.



CHECK VALVE
Piston Type For Freon. Sizes ⅜″ through 4⅛″ O.D.S.



DRIER
Cartridge type with dispersion tube

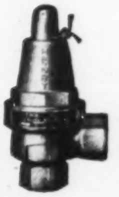


EXTRA CAPACITY DRIER
2 cubic inches more than established practice.

. . . Write for these catalogs

No. 100 Packless and packed valves, strainers, driers, ammonia valves, check valves, relief valves, three-way valves, scale traps, liquid gauge sets, flange unions, nut unions and accessories for air conditioning and refrigeration and industrial uses.

No. 70 Drop forged and cold rolled steel fittings.



DIAPHRAGM RELIEF VALVE
Large capacity—fast positive relief and reseating action. Very small differential between opening and closing pressures.

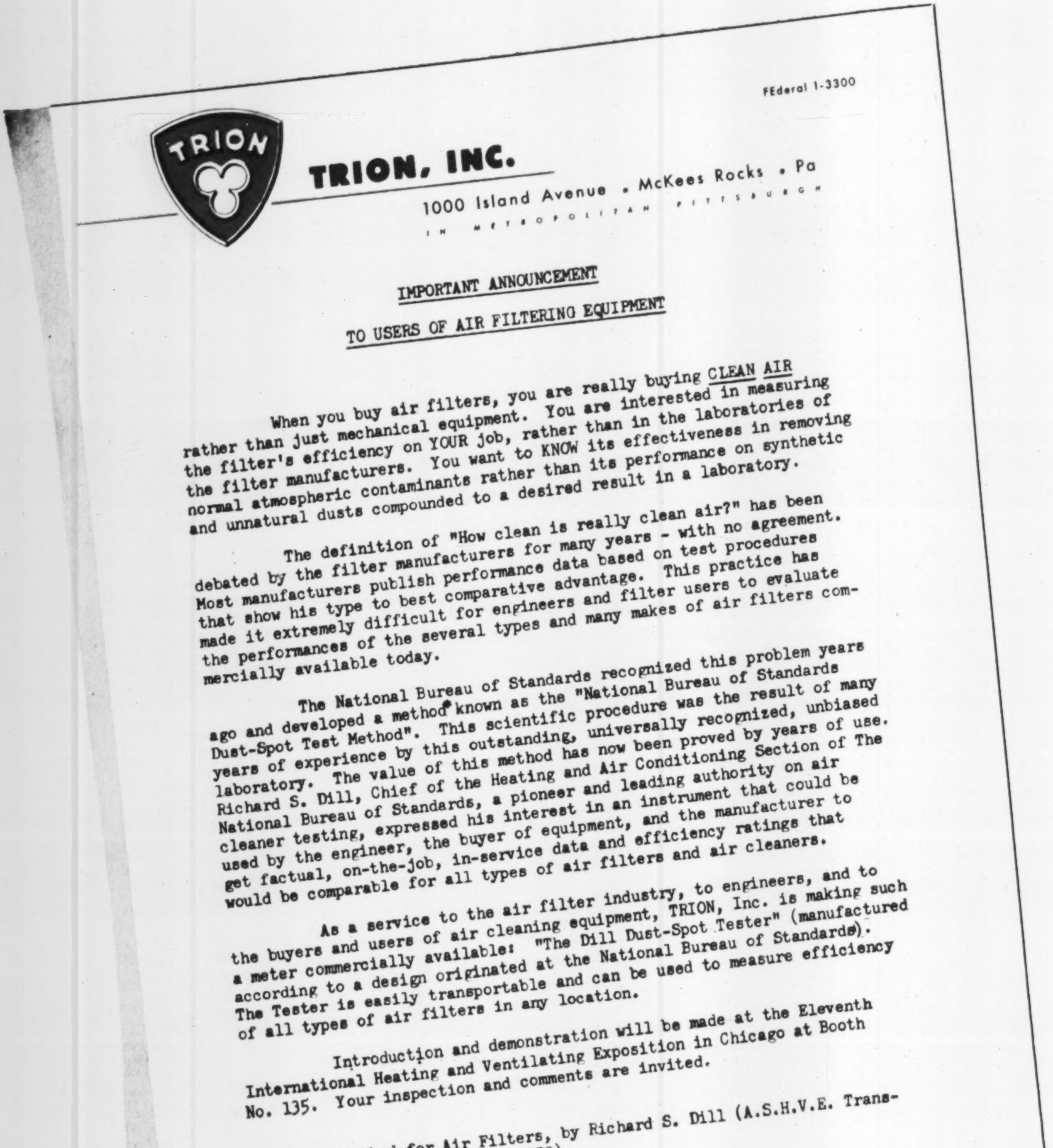
STRAIGHT-THROUGH RELIEF VALVE
Large capacity—All Brass Construction. Sizes ¼″ M.P.T. through 1″ F.P.T.

Stocked and Sold by Leading Jobbers

VALVES • DRIERS • STRAINERS • CONTROL DEVICES and ACCESSORIES FOR REFRIGERATION and AIR CONDITIONING and INDUSTRIAL APPLICATIONS

HENRY VALVE COMPANY

MELROSE PARK, ILLINOIS Chicago Suburb • Cable HEVALCO, MELROSE PARK, ILLINOIS

FEderal 1-3300

TRION

TRION, INC.

1000 Island Avenue • McKees Rocks • Pa

IN METROPOLITAN PITTSBURGH

IMPORTANT ANNOUNCEMENT

TO USERS OF AIR FILTERING EQUIPMENT

When you buy air filters, you are really buying CLEAN AIR rather than just mechanical equipment. You are interested in measuring the filter's efficiency on YOUR job, rather than in the laboratories of the filter manufacturers. You want to KNOW its effectiveness in removing normal atmospheric contaminants rather than its performance on synthetic and unnatural dusts compounded to a desired result in a laboratory.

The definition of "How clean is really clean air?" has been debated by the filter manufacturers for many years - with no agreement. Most manufacturers publish performance data based on test procedures that show his type to best comparative advantage. This practice has made it extremely difficult for engineers and filter users to evaluate the performances of the several types and many makes of air filters commercially available today.

The National Bureau of Standards recognized this problem years ago and developed a method* known as the "National Bureau of Standards Dust-Spot Test Method". This scientific procedure was the result of many years of experience by this outstanding, universally recognized, unbiased laboratory. The value of this method has now been proved by years of use. Richard S. Dill, Chief of the Heating and Air Conditioning Section of The National Bureau of Standards, a pioneer and leading authority on air cleaner testing, expressed his interest in an instrument that could be used by the engineer, the buyer of equipment, and the manufacturer to get factual, on-the-job, in-service data and efficiency ratings that would be comparable for all types of air filters and air cleaners.

As a service to the air filter industry, to engineers, and to the buyers and users of air cleaning equipment, TRION, Inc. is making such a meter commercially available: "The Dill Dust-Spot Tester" (manufactured according to a design originated at the National Bureau of Standards). The Tester is easily transportable and can be used to measure efficiency of all types of air filters in any location.

Introduction and demonstration will be made at the Eleventh International Heating and Ventilating Exposition in Chicago at Booth No. 135. Your inspection and comments are invited.

* A Test Method for Air Filters, by Richard S. Dill (A.S.H.V.E. Transactions, Vol. 44, 1938, p. 379).

DESIGNERS AND MANUFACTURERS OF EQUIPMENT FOR ELECTROSTATIC CLEANING AND PURIFICATION OF AIR OR OTHER GASES

WHY CHRYSLER AIRTEMP IS THE FASTEST SELLING LINE OF "PACKAGED" AIR CONDITIONERS

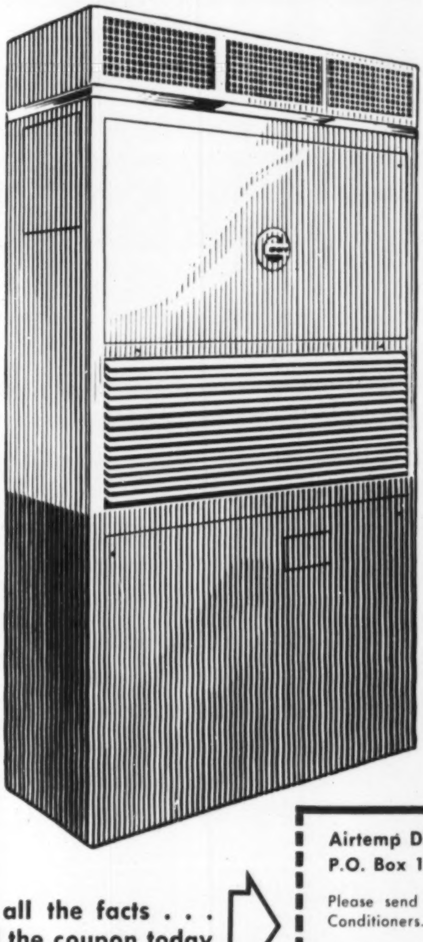
There are lots of reasons why Chrysler Airtemp sells more "Packaged" Air Conditioners. One very important reason is *flexibility*. These unique advantages make Chrysler Airtemp a *more flexible* unit.

- You can distribute air from the front—or back—or both front and back—with a Chrysler Airtemp unit.
- You can have the return air enter the front—or the back—or both front and back—with a Chrysler Airtemp unit.
- You can put the evaporator and fan section in one place, and the compressor section in another.
- All compressors carry an optional 5-year warranty.

Chrysler Airtemp Field Engineers studied thousands of jobs and found this flexibility means *greater profit* for Chrysler Airtemp dealers!

Comfort Zone

70
80
60
90
50
100
40
110
CHRYSLER AIRTEMP
CHRYSLER CORPORATION



"Packaged" Air Conditioners
Six models from 2 to 15 H.P. cap. Meets every cooling need.

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Please send full details on Chrysler Airtemp Comfort Zone "Packaged" Air Conditioners.

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Engineered Products

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Commercial, Industrial, Institutional, and Residential

CEILING DIFFUSERS
HIGH PRESSURE DIFFUSER UNITS
GRILLES and REGISTERS
CONVECTORS
BASEBOARD

ONE SOURCE
FOR
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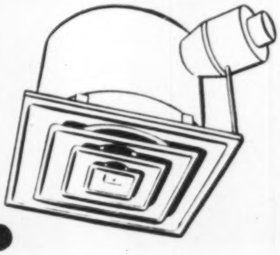
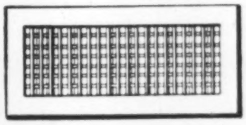
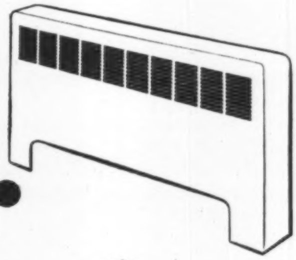
Aerofuse Ceiling Diffusers are installed at the vital point of air delivery in important buildings from coast to coast. A wide range of types and sizes to meet every requirement of appearance and performance.



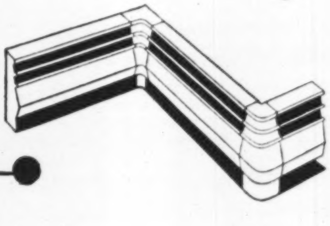
T & B High Pressure Diffuser Units are the result of many years of laboratory experiment and practical experience in the field. Units now in operation handle branch duct velocities up to 3500 FPM, discharge air without noise or drafts.



Tri-Flex Supply Air Grilles and Registers . . . Aerovane Return Air Grilles and Registers. Standard sizes for economy and prompt delivery. Individually adjustable face bars. Registers equipped with opposed blade dampers.



T & B Convectors are widely used in homes and apartments. Two types are available . . . Type R for recessed installation . . . Type F for free standing installation. Styled for beauty, engineered for comfort.



T & B Baseboard combines the heating comfort and smart appearance essential in the modern home. Two types . . . recessed . . . free standing . . . both designed with two-piece construction for ease of installation.

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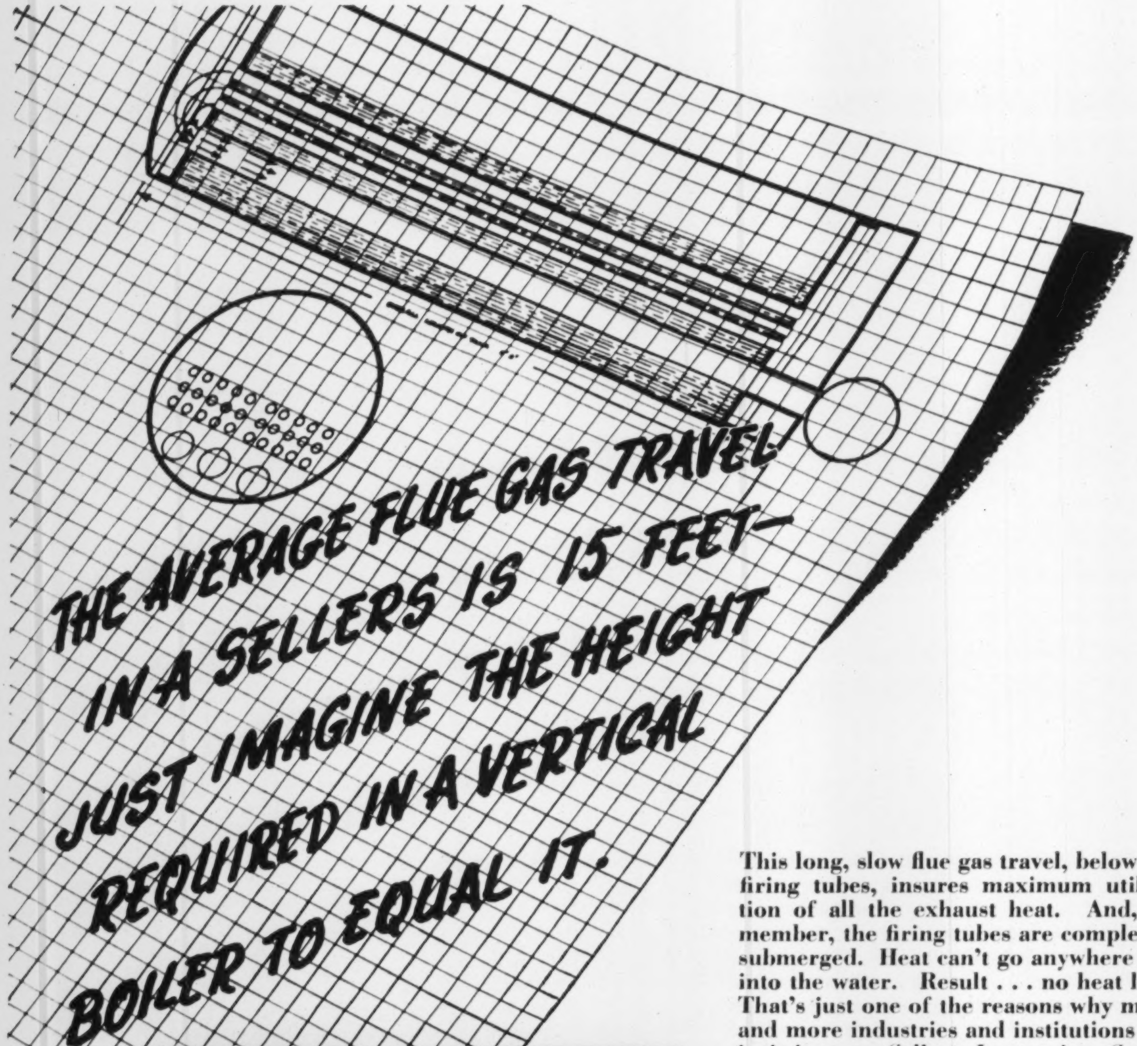
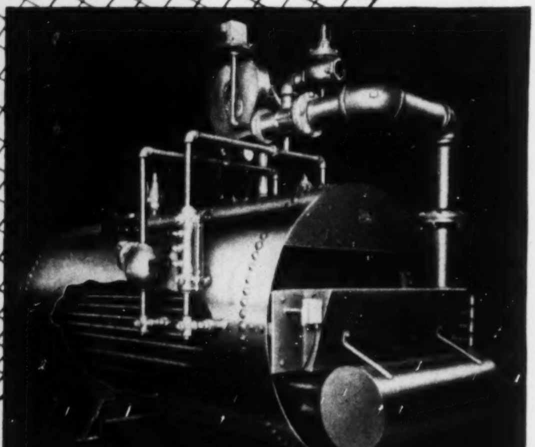
TUTTLE & BAILEY inc

NEW BRITAIN, CONNECTICUT


THE AVERAGE FLUE GAS TRAVEL
IN A SELLERS IS 15 FEET—
JUST IMAGINE THE HEIGHT
REQUIRED IN A VERTICAL
BOILER TO EQUAL IT.



This long, slow flue gas travel, below the firing tubes, insures maximum utilization of all the exhaust heat. And, remember, the firing tubes are completely submerged. Heat can't go anywhere but into the water. Result . . . no heat loss. That's just one of the reasons why more and more industries and institutions are insisting on Sellers Immersion Steam Boilers. Our Bulletin No. 1206-C gives full details about the 12 sizes available. Write today.

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IMMERSION STEAM BOILER

SELLERS ENGINEERING CO.

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Blast Heaters—Immersion Automatic Water Heaters—Combustion Units—Industrial Gas Burners—Immersion Tank Heaters—Vertical Steam Boilers—Gas Combustion Equipment.

To meet your needs . . .

W-S FITTINGS OF FORGED

STAINLESS

STEEL

The "Featherlite"

Standard Design

Stainless systems are critical and costly . . . Protect them where trouble usually starts . . . with

W-S FORGED STAINLESS FITTINGS

These life-of-the-system joints are available in either screw-end or socket-welding types to meet your *assembly* needs. They're manufactured for stock in the more popular grades to meet your *process* needs. And they're all precision machined from solid STAINLESS Steel Forgings to meet a *universal* need for the strongest, most accurate and trouble-free fittings money can buy.

Get the full benefit of your investment . . . insist on W-S FORGED fittings wherever costly stainless pipe or tubing meet . . . *permanently.*

WRITE FOR BULLETIN S-1 for Standard Design 2,000 to 6,000 pound cold non-shock pressure

WRITE FOR BULLETIN S-2 for "Featherlite" Design 1,000 pound cold non-shock pressure

Screw-End and Socket-Weld Types

- Tighter
- Stronger
- More Uniform
- Lower Service Cost

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W-S

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H. K. PORTER COMPANY, INC.

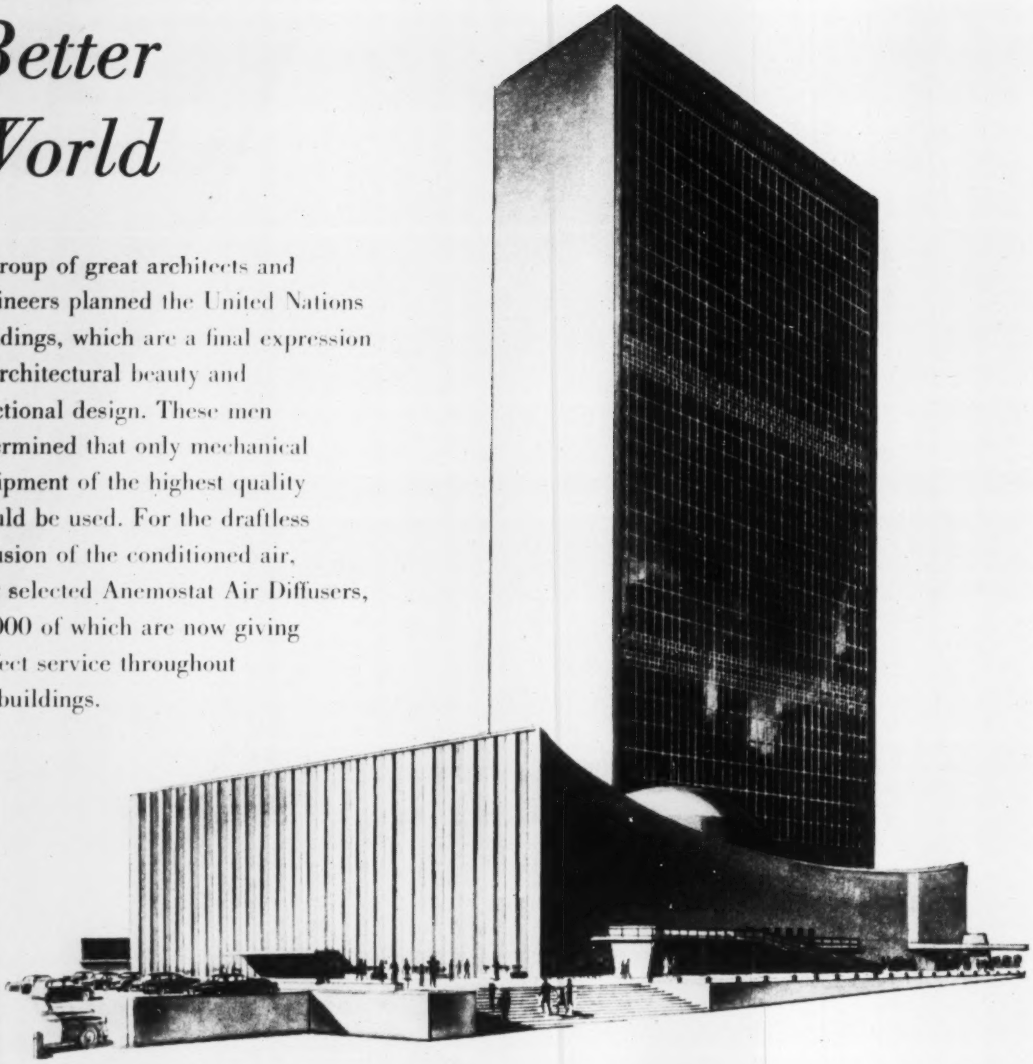
ROSELLE, NEW JERSEY

9-M-69

Designers and Manufacturers of Forged Steel Fittings, Hand Pumps, Jacks, Wire Rope Shears and Pipe Benders

Plans for a Better World

A group of great architects and engineers planned the United Nations buildings, which are a final expression of architectural beauty and functional design. These men determined that only mechanical equipment of the highest quality should be used. For the draftless diffusion of the conditioned air, they selected Anemostat Air Diffusers, 12,000 of which are now giving perfect service throughout the buildings.



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ANEMOSTAT®

DRAFTLESS *Aspirating* **AIR DIFFUSERS**

ANEMOSTAT CORPORATION OF AMERICA

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REPRESENTATIVES IN PRINCIPAL CITIES

D.I.P.
®
FIRST IN THE FIELD OF PRE-SEALED INSULATED PIPING FOR STEAM HOT WATER REFRIGERANTS
1678
12

Traffic has been running over this steam line for ten years without damaging the Durant Insulated Pipe.

D.I.P. was installed here in less than 8 hours

For a New England railroad, over 120 feet of 6 inch steam line had to be run under eight tracks as quickly as possible—without delaying main line trains. A trench was opened under the tracks, limited in width by the distance between ties. The Durant pre-fabricated units were welded together, joints covered and sealed, and the elongated section was jacked through under the rails. Work was executed in less than eight hours. The only fill over the D. I. P. was the customary thickness of broken stone ballast. Traffic has been running over this steam line for more than ten years without damaging the D. I. P. units.

The cost of installing D. I. P. is extremely low because this conduit can be laid on the bottom of a graded open trench. No external casing-welding, no drains, tile, concrete tunnels, special tools or equipment are needed. Use of expansion loops, ells and tees eliminate manholes, expansion joints and other features requiring maintenance. For above-ground installation, any type of pipe support can be used.

D. I. P. is the *only* pre-sealed insulated conduit not dependent on a metal jacket for protection from moisture and corrosion. A 1″ layer of asphalt is the waterproofing protection. Steam pressures up to 1000 psi.

Write today for catalog 1-A, for engineering service, or a representative's call.

Representatives in Principal Cities

PRE SEALED ®

Western Division: **DURANT INSULATED PIPE COMPANY**
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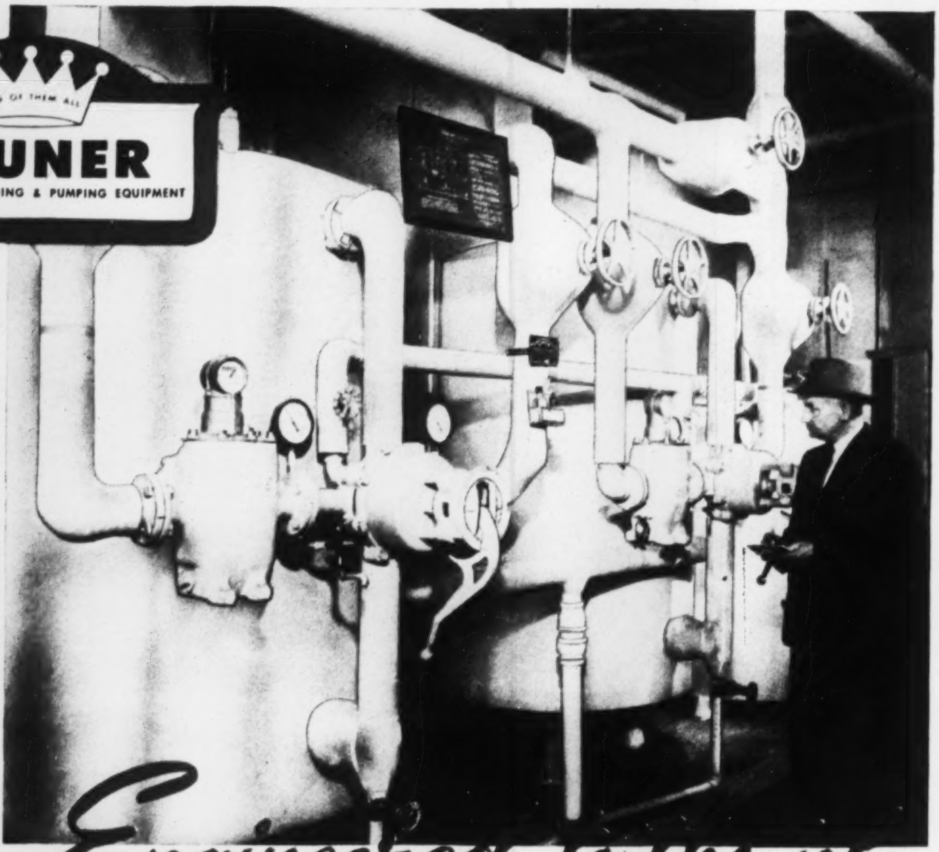
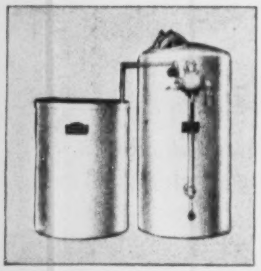
KING OF THEM ALL

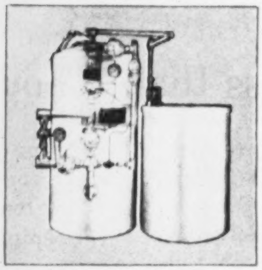
BRUNER

WATER CONDITIONING & PUMPING EQUIPMENT



Engineered to the job





Heavy-duty models — 80 to 160 gpm. 600,000 to 1,200,000 gr. cap. Carried in stock. UPPER LEFT, Solo Valve. UPPER RIGHT, Dial-O-Matic. LOWER RIGHT, Brucex Feeder for corrosion control and prevention of red water. Write Dept. HPA for catalog.

Water Softeners for Industry

Pictured on the job at the Methodist Hospital of Central Illinois at Peoria, Illinois is a BRUNER Industrial heavy-duty model engineered to produce 70,000 gallons of pure soft water from water of 26 gr. hardness. This installation is another example of BRUNER design and manufacturing craftsmanship that assures absolute satisfaction.

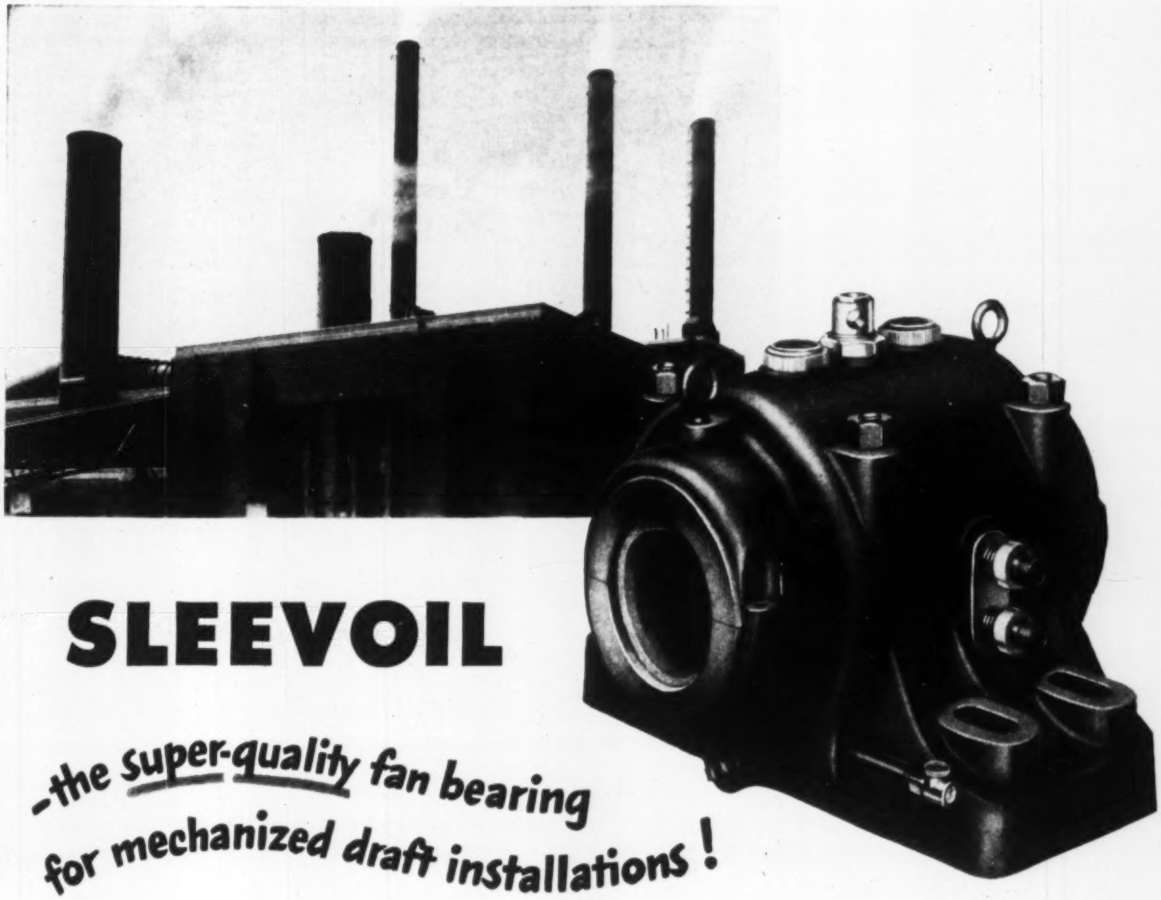
●

It will pay you to get the recommendations of the Bruner Corporation laboratories if you have a problem in the field of water softening, filtering or conditioning. Your inquiry will receive prompt attention. Of course, there is no obligation.

"America's Most Complete Line of Quality Water Softeners and Filters"

Mfg. by BRUNER CORPORATION [illegible], Wis.

Offices in Principal Cities



SLEEVOIL

—the *super-quality* fan bearing for mechanized draft installations!

● Hundreds of generating plants in America run on Dodge Sleevoil Bearings. These famous bearings combine quietness, long life and dependability to a degree unique in the bearing field. They offer engineers of costly power plants a priceless safeguard for their equipment.

Sleevoil Bearings are a Dodge development—created especially to meet the exacting requirements of fan and blower service. They are ideal bearings for important installations calling for induced or forced draft. Designed in cooperation with engineers of leading fan and blower manufacturers, they have a long record of dependable performance in critical service.

Dodge Sleevoil Pillow Blocks are normally available from stock—in both plain and water-cooled types, in shaft sizes from 1-7/16" to 8". Write us for information.

DODGE MANUFACTURING CORPORATION
1600 Union Street, Mishawaka, Indiana

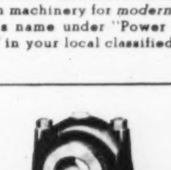
DODGE
of Mishawaka, Ind.

CALL THE TRANSMISSIONEER, your local Dodge Distributor. Factory trained by Dodge, he can give you valuable assistance on *modern* power transmission machinery for *modern* installations. Look for his name under "Power Transmission Equipment" in your local classified phone book.

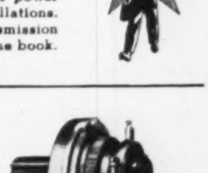
FIRST IN POWER TRANSMISSION MACHINERY!

SEALED-LIFE V-BELTS; TAPER-LOCK SHEAVES

TORQUE-ARM SPEED REDUCERS

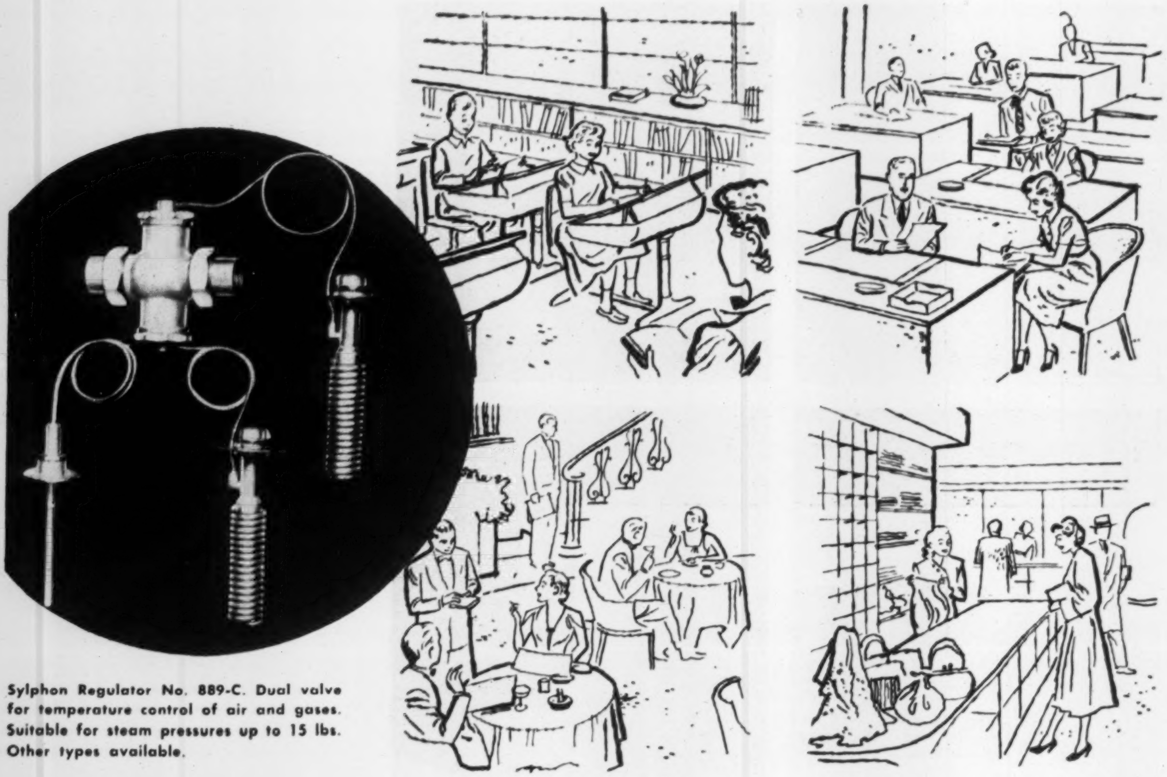


DODGE-TIMKEN PILLOW BLOCKS



ROLLING GRIP AND DIAMOND D CLUTCHES

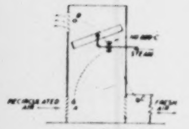
FOR YOUR NAME PLATE REQUIREMENTS, WRITE OUR SUBSIDIARY, CHICAGO THRIFT-ETCHING CORPORATION, 1555 SHEFFIELD AVENUE, CHICAGO 22, ILLINOIS



Sylphon Regulator No. 889-C. Dual valve for temperature control of air and gases. Suitable for steam pressures up to 15 lbs. Other types available.

DEPENDABLE COMFORT wherever it goes!

Sylphon Control



Packaged Air Conditioner. Room temperature held constant by main port of No. 889-C from bulb "A" in recirculated air. Bulb "B" in discharge serves as "low limit" control to prevent cold drafts, with outdoor compensating bulb "C" to prevent "droop." For simplicity, the illustration above does not show condensing unit, filter, cooling coils or other details.

● In schools, offices, hotels, stores, institutions, theaters—wherever comfortable, constant temperature is required—thousands of Sylphon temperature regulators are on the job. For Sylphon controls are designed to meet any and every heating, ventilating or air conditioning requirement. One or a combination of these dependable regulators handles the job efficiently—inexpensively.

Sylphon Regulator 889-C, pictured here, is one of the Sylphon line. It is used for control of duct heating and ventilating systems. Fully modulating and self-powered, it has a simple dial adjustment—maintains temperature as wanted. No exposed operating mechanism—no wiring—no air piping required. Its packless valve eliminates service problems. Built for long, trouble-free service—like all Sylphon controls.

Write for details about Regulator 889-C, or for helpful information about other Sylphon Controls for your particular heating, ventilating or air conditioning requirements. Ask for Catalog AH-B

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FIRST WITH BELLOWS

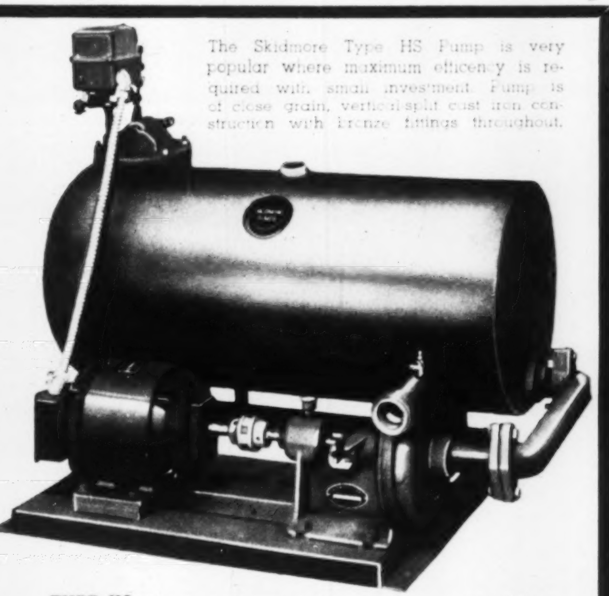
Temperature Controls • Bellows Devices • Bellows Assemblies

FULTON SYLPHON
DIVISION
ROBERTSHAW-FULTON CONTROLS CO., KNOXVILLE 4, TENN.

Canadian Representatives, Darling Brothers, Montreal

The right TYPE for each and every heating installation

The Skidmore Type HS Pump is very popular where maximum efficency is required with small investment. Pump is of close grain, vertical-split cast iron construction with bronze fittings throughout.



TYPE HS Pump will operate at a wide range of pressures encountered in condensation pumps. CAPACITIES—range from 1,000 to 65,000 sq. ft. E.D.R., and discharge pressures from 10 to 75 pounds. Single or duplex units.

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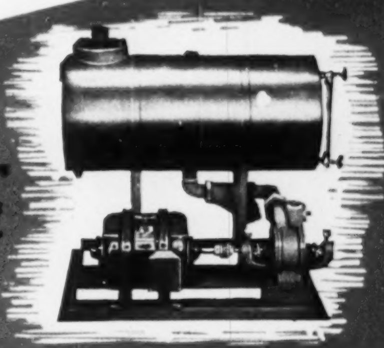

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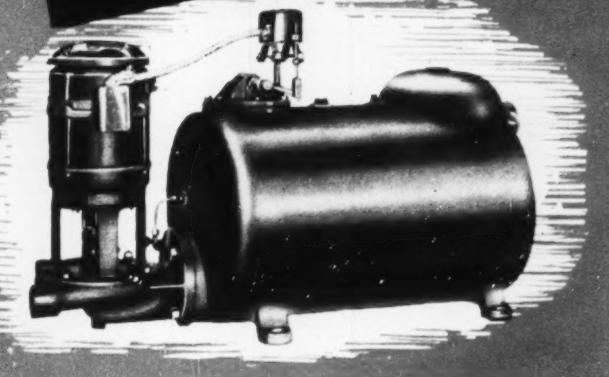
TYPE TM Turbine Pump is completely assembled and mounted on either steel or cast iron base.
CAPACITIES — Built for boilers up to 250 H.P. and discharge pressures up to 150 pounds.

SKIDMORE PUMPS

Choose with Confidence



TYPE VC Skidmore Condensate Pump is built for rugged and dependable service. Pump has low inlet connection, perfect balance and absence of vibration. CAPACITIES—range from 1,000 to 65,000 sq. ft. E.D.R., and discharge pressures from 10 to 75 pounds.

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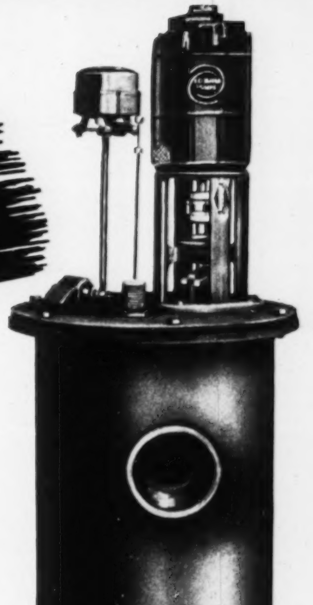

TYPE UV Pump is recommended for below floor level returns. Unit is bolted to sump type receiver. CAPACITIES—ranging from 2,000 to 40,000 sq. ft. E.D.R., and discharge pressures from 10 to 75 pounds. Single or duplex units.

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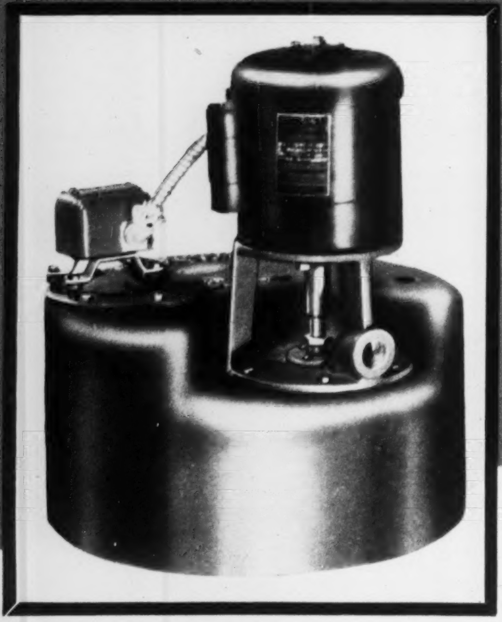

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TYPE CV CONDENSATION TYPE

TYPE CV Vertical pump requires a minimum of space. Designed for returning condensate to the boiler, or other points, from all types of low pressure steam heating systems and process equipment.

CAPACITIES—range from 500 to 10,000 sq. ft. E.D.R. and discharge pressures from 10 to 20 pounds.

SKIDMORE PUMPS
For Every Requirement

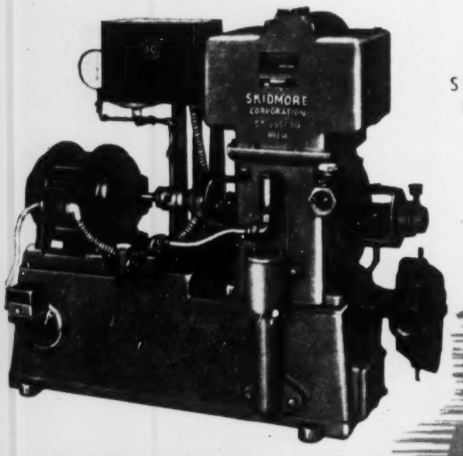
SKIDMORE VACUUM PUMPS

The Skidmore Vacuum Pumps automatically adjust themselves to the varying conditions of the system. Due to clearance between moving parts, wear is eliminated and efficiency maintained. Available in both single and duplex units.

CAPACITIES—ranging from 5,000 to 100,000 sq. ft. E.D.R.

MAINTAINED
SKIDMORE PUMPS
EFFICIENCY

Write for complete engineering bulletins — Skidmore builds a heating pump for every installation.



SINGLE UNIT

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DUPLEX UNIT

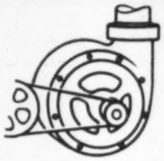
SKIDMORE CORPORATION, ST. JOSEPH, MICHIGAN

MANUFACTURERS OF HEATING PUMPS FOR OVER A QUARTER OF A CENTURY

THESE MODERN STEAM-PAK * GENERATORS

EXCLUSIVE
IRIS
SHUTTER
EXCLUSIVE
METERING
OIL PUMP

FEATURES WILL SAVE YOU THOUSANDS



FORCED DRAFT BLOWER

Room air at 70° is blown into the front of the boiler to produce forced draft at the lowest h.p. per volume air. This method also eliminates mechanical maintenance found with induced draft type fans.

BURNER AIR COMPRESSOR

Fuels are atomized at the burner nozzle by using compressed air which breaks up completely all the various grades and types of residual oils into gases, assuring easier start and more efficient combustion.

COMBUSTION CHAMBER

Preformed carborundum blocks—factory designed and built—are used in the making of the combustion chamber due to its high heat transfer, dependability and long life with easier maintenance or replacement.

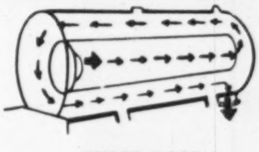
OF DOLLARS A YEAR ON STEAM COSTS

SWIRLING FLAME

High speed flame travel with exceptionally high heat transfer is obtained by a unique air injection mechanism that swirls the flame around the combustion chamber but keeps loose flames from impinging chamber.

TARGET RING

Located in an intermediate position in the combustion chamber is a carborundum ring that reforms the flame by squeezing it, drawing the outer circle of pre-heated air into the center of the flame.



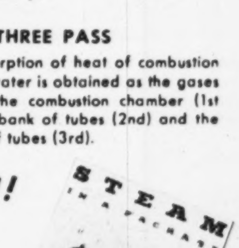
THREE PASS

Maximum absorption of heat of combustion by the boiler water is obtained as the gases pass through the combustion chamber (1st pass), the top bank of tubes (2nd) and the bottom bank of tubes (3rd).

* With the exclusive Iris Shutter and Metering Oil Pump which automatically regulate air and oil flow to load requirements, York-Shipley Steam-Pak Generators are the most efficient on the market today. Available in a complete range of sizes from 15 to 300 h.p. for all grades of fuel oil or gas or a combination of gas and oil, these Steam-Paks save their users many thousands of dollars a year.

GET THIS BOOK TODAY!

"Steam in a Package"—
a 14-page book which tells the
installation and operating
advantages of York-Shipley
Steam-Pak Generators.
Write today for your free copy
of Bulletin 201.



Steam-Pak Generators—A Product of York-Shipley, Inc., York, Pa.

VERSATILE *Acme*
EVAPORATIVE CONDENSERS
fit wide range of applications

The First Church of Christ Scientist in Birmingham, Alabama.

FP-60 Evaporative Condenser installation at the First Church of Christ Scientist.

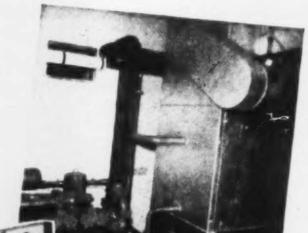
Two recent installations of Acme Evaporative Condensers show the wide range of applications for which they are ideally suited. The ability to conserve water makes the operation very economical, while the functional design assures complete hot weather comfort.

One installation was made in the First Church of Christ Scientist in Birmingham, Alabama, by the Hardy Corporation. The main auditorium seated 650 persons and a Sunday School room accommodated 148 more. Despite the variable load and Birmingham's hot climate the FP-60 Acme Evaporative Condenser has been highly efficient and completely satisfactory.

A completely different installation was made by the Krauss Heating and Ventilating Company, at the Gulf Winds Restaurant in St. Petersburg, Florida. An FP-30 evaporative condenser serving as an important component of the air conditioning system, was installed.

The air conditioning added much to the comfort of the patrons of this beautiful restaurant. Despite the unusual hardness of the water, the equipment is satisfactory in every respect, saving over 95% of the water used.

Write for more complete details on the advantages of Acme Evaporative Condensers



FP-30 Evaporative Condenser installed at the Gulf Winds Restaurant.

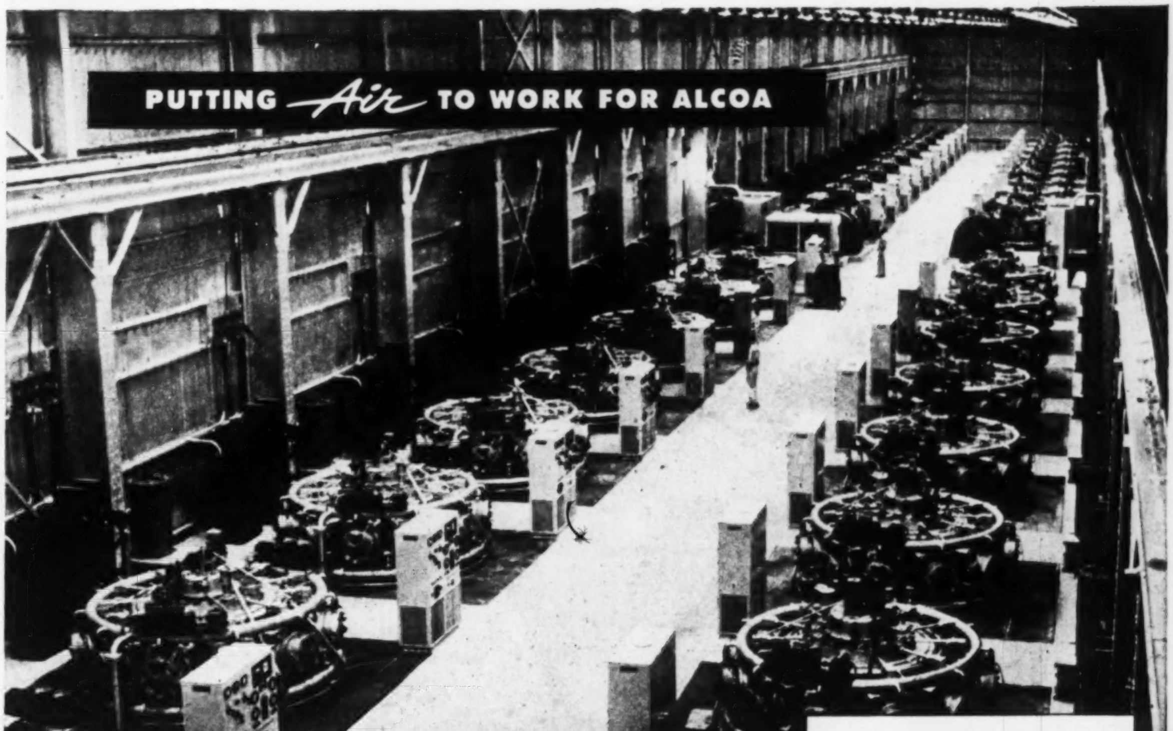
The Gulf Winds, popular St. Petersburg, Florida restaurant.

ACME INDUSTRIES, INC. JACKSON, MICHIGAN, U. S. A.

Air Conditioning and Refrigeration Division

CONTINUOUSLY SERVING THE AIR CONDITIONING AND REFRIGERATION INDUSTRIES SINCE 1919

PUTTING *Air* TO WORK FOR ALCOA



These huge natural gas engines, about 40 to a room, drive the generators, furnishing all the electricity used by Alcoa to produce 170,000,000 pounds of aluminum in this plant yearly.

800 BOXCARS OF AIR

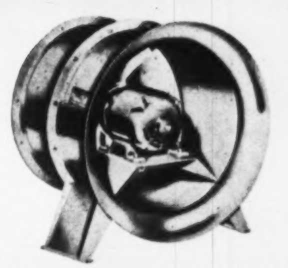
KEEP GENERATORS AT PEAK EFFICIENCY

Down at Point Comfort, Texas, a new kind of power plant was built a few years ago. 120 engines, running on natural gas, drive huge electric generators. Their job: to supply the current to smelt defense-needed aluminum. One of the biggest problems, though, was to keep the equipment running cool and thus at top efficiency.

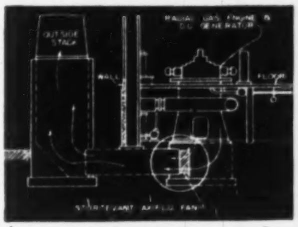
120 Westinghouse Axiflo® fans did the trick. Each draws 12,000 cubic feet of air through the generators every minute, picking up the excess heat. Then the air is piped through concrete ducts and out exhaust stacks which line both sides of the building.

Now Alcoa has just expanded this power plant. They have installed 74 new engines—and Westinghouse has supplied 74 more Axiflos. All in all, the 194 fans will move over 2,300,000 cubic feet of cooling air through the generators *every minute*. That's enough air to fill a trainload of 800 boxcars!

One day—today or in the near future—you may have a problem that involves *putting air to work*. When you do, remember that Westinghouse has the most complete air conditioning, air cleaning and air handling line in the industry. See the new Catalog 600. It contains 60 fact-filled pages on products, uses, and helpful data. To get your free copy, just call your local Westinghouse-Sturtevant office. Or, write to Westinghouse Electric Corporation, Sturtevant Division, Hyde Park, Boston 36, Mass.



Axiflo Fans keep them cool. They're compact, efficient, and **trouble-free.** That's important for hard-to-get-at jobs.

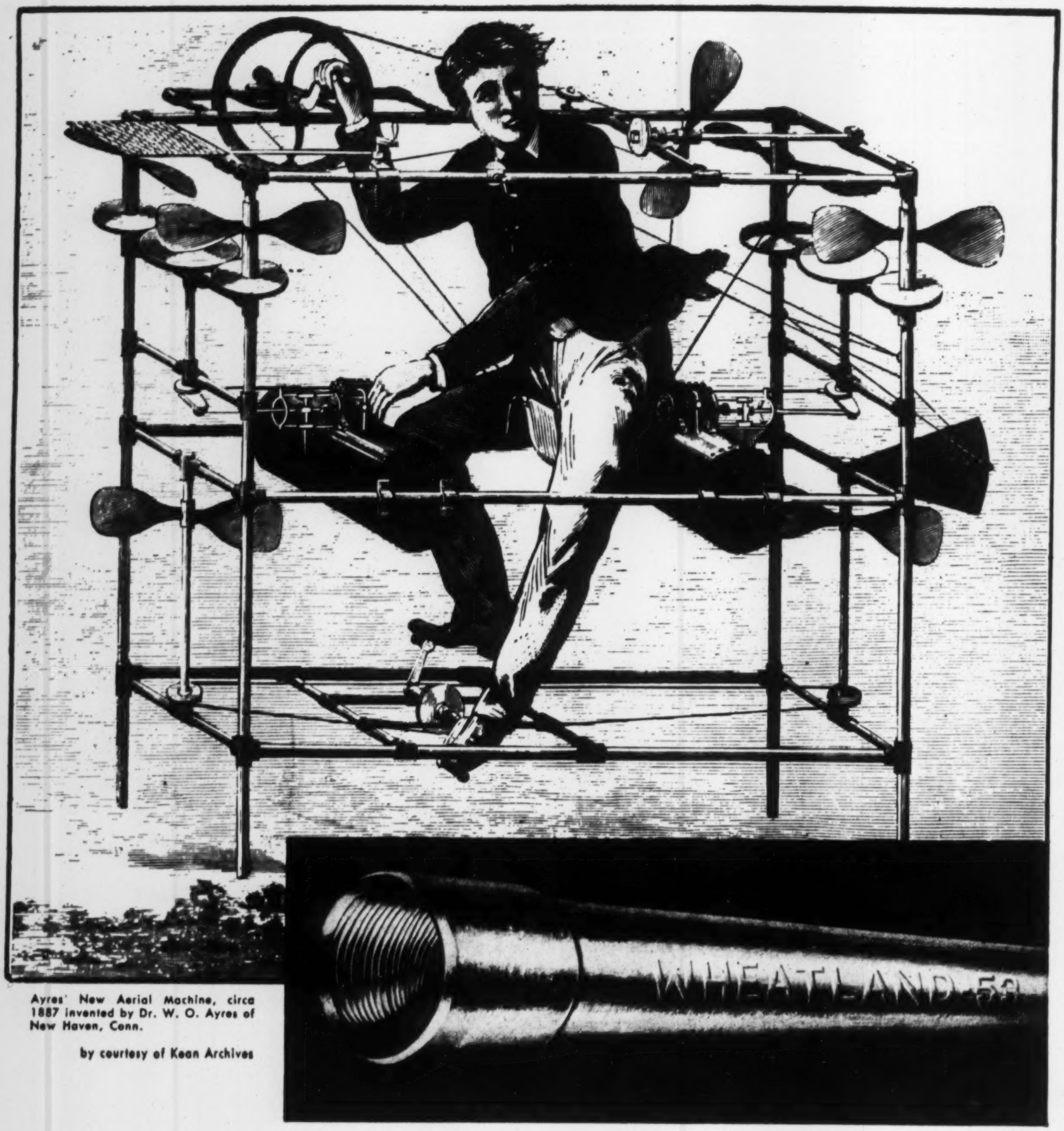


Cooling-air drawn through the engine generators picks up the intense heat, then safely exhausts it through individual stacks.

YOU CAN BE SURE...IF IT'S Westinghouse

J80281

AIR HANDLING



Ayres' New Aerial Machine, circa 1887 invented by Dr. W. O. Ayres of New Haven, Conn.

by courtesy of Kean Archives

PIPE WITH THE YEARMARK

IMPORTANT DATES IN HISTORY

Way back in 1887, people were still using steel pipe for every conceivable need. Today, in 1953, steel pipe continues to find its way into American home life and form a strong background for American industry. Whatever the year may be, when the steel is welded into a length of Wheatland's "pipe with the yearmark", it is always a sign and a mark of endurance.

WHEATLAND TUBE COMPANY

BANKERS SECURITIES BUILDING, PHILADELPHIA 7, PA

Scrap is urgently needed to help keep America strong and free. Do your part — *get in your scrap today!*

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Famous Labels suggest the choice

Many of the big textile mills . . . names your wife will recognize . . . "air-control" many of their manufacturing operations with Worthington air conditioning and refrigeration.

And many of the famous shops where the mills' products are sold . . . Saks Fifth Avenue, The Higbee Company, J. L. Brandeis, Lane Bryant, many Sears Roebuck Stores . . . are air-conditioned by Worthington.

No other manufacturer makes so complete a line. A Worthington system is all Worthington-*made* — not just Worthington-assembled — assuring you of perfectly balanced operation and unit responsibility.

Call your local Worthington distributor today. Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.

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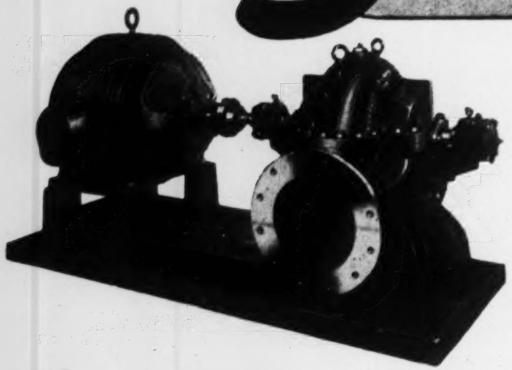
AIR CONDITIONING AND REFRIGERATION

The Most Complete Line... Always the Correct Recommendation

"Buffalo" Tips on Better Pumping

3 TYPES of PUMPS and what each offers you —

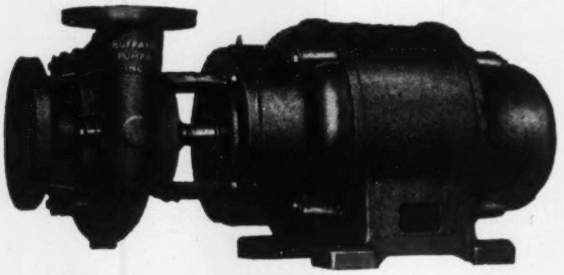


1. DOUBLE SUCTION

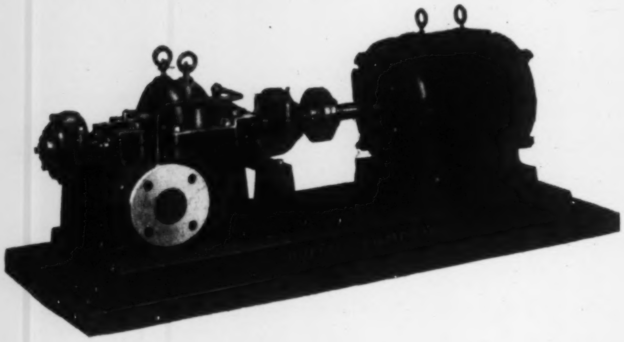
This "Buffalo" Pump offers a high degree of efficiency in pumping large volumes of clear water. Available in capacities for 10 to 10,000 gpm at up to 300 ft., these pumps are hydraulically balanced—water entering both sides of the impeller in equal volume and pressure. Bearings on each end of shaft mean extra long wear. Horizontally divided casing makes for extreme accessibility in inspection and servicing. Full details in BULLETIN 955-P.

2. CLOSE-COUPLED

Here is a ruggedly compact pump for those "close-quarters" installations. Pump and motor are rigidly mounted together with impeller on motor shaft, which means *permanent alignment.* "Buffalo" builds these pumps in a variety of alloys for specific liquids, with threaded or flanged inlets and outlets. Pump casing may be rotated, or removed for inspection—an important maintenance factor. WRITE for BULLETIN 975-B.



3. MULTI-STAGE



Each extra stage adds pressure! That's why pumps like these "Buffalo" Type "RR" (2 and 4-stage models) operate efficiently against high pressures (500 psi or 1500 ft. heads). These "Buffalo" Pumps have proven themselves very durable in boiler feed and other clear water installations. Bearing support on both ends of the shaft—rugged, horizontally divided casing—solid, rigid base—all contribute to easy maintenance and long life. For further details, write for Bulletin 980-B.

BUFFALO PUMPS, INC.
171 MORTIMER STREET BUFFALO, N. Y.
Subsidiary of Buffalo Forge Company
Canada Pumps, Ltd., Kitchener, Ont. Sales Representatives in all Principal Cities

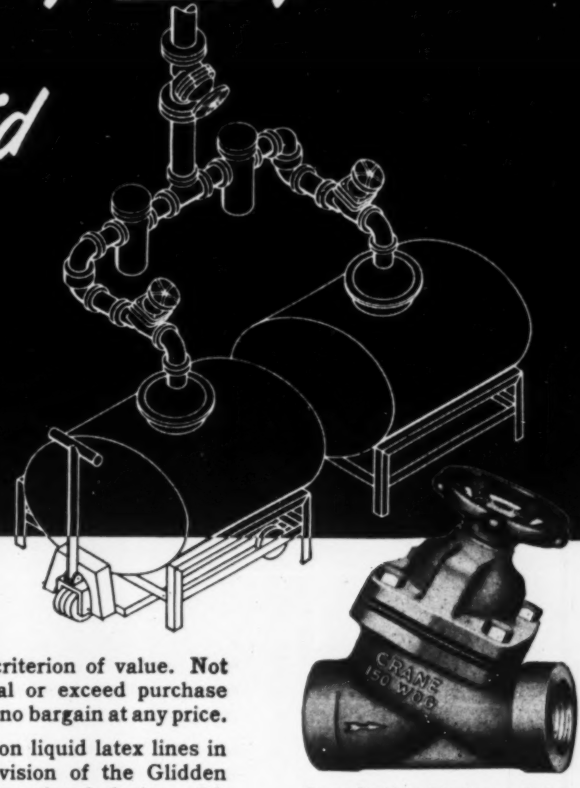
A BETTER CENTRIFUGAL PUMP FOR EVERY LIQUID

It's not what you Pay for Valves ...it's what they Cost you

on Sticky Fluid

for instance

(A Case History)



Crane Packless Diaphragm Valves, made with iron, brass, aluminum, or 18-8 Mo body, lined or unlined. See your Crane Catalog.

What you pay for valves is not the final criterion of value. Not when maintenance costs can quickly equal or exceed purchase price. And a valve that hinders production is no bargain at any price.

Take the case of valves formerly used on liquid latex lines in a paint factory—the Adams & Elting Division of the Glidden Company, Chicago. The valves were conventional design with working parts exposed to fluid. The sticky latex accumulated and congealed in the bonnet and stem threads. Too often, the valves were inoperable, forcing frequent costly maintenance with costlier production delays.

The trouble was stopped completely with Crane Diaphragm Valves. Their sealed-to-fluid bonnet keeps latex out of the working parts. They operate smoothly; never stick, never need cleaning out.

Today, more than ever, you need greater assurance of quality. You get it in Crane Valves—the recognized standard of quality with thrifty buyers in every industry. Your big Crane Catalog offers complete selections for all needs; your Crane Representative is always at your service.

for the
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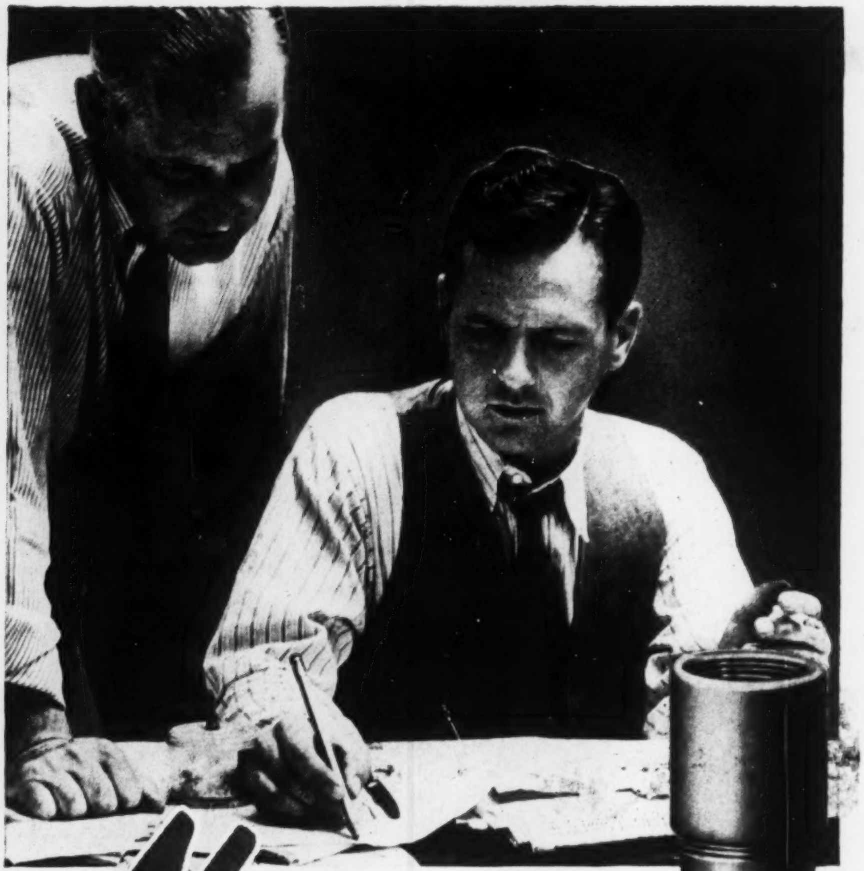
Crane Co., *General Offices:* 836 S. Michigan Ave., Chicago 5, Illinois
Branches and Wholesalers Serving All Industrial Areas.

VALVES • FITTINGS • PIPE • PLUMBING • HEATING

When you figure the pipe you can be sure–



—if it's National

● A lot of people have faced a lot of piping problems over the last 60 years. During that time, so many of them have solved their requirements with one pipe—NATIONAL Steel Pipe—that they have made NATIONAL the largest selling pipe in the world.

Other things have helped too . . . the fact that one integrated organization has complete control of U·S·S NATIONAL Steel Pipe production, from the raw material to the finished product . . . the fact that advanced steel-making facilities and special pipe manufacturing processes are here combined with the experience of thousands of skilled craftsmen to produce steel pipe of uniformly high quality and utmost dependability.

As a result, when you decide on NATIONAL Steel Pipe you can be sure you'll always get pipe whose metallic structure, strength, sound joints, superior cutting, bending and threading properties assure easy installation and long, trouble-free performance.

These are the reasons why "old timers" swear by NATIONAL Steel Pipe and why NATIONAL is being consistently specified by the new generation of architects, engineers and contractors. In turn they have found that for low cost, easy installation and *proved* reliability in service, no other pipe quite fills the bill like NATIONAL.

So when you need an all-purpose steel pipe . . . make it NATIONAL.

NATIONAL TUBE DIVISION, UNITED STATES STEEL CORPORATION
PITTSBURGH, PA.
COLUMBIA-GENEVA STEEL DIVISION, SAN FRANCISCO, PACIFIC COAST DISTRIBUTORS
UNITED STATES STEEL EXPORT COMPANY, NEW YORK

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U·S·S NATIONAL Steel PIPE

UNITED STATES STEEL

Going DOWN

THE COST OF AIR CONDITIONING AND VENTILATING drops markedly when you make Dorex Air Recovery part of the system. That's because only about one-third as much outside air has to be heated or cooled. Dorex Air Recovery "manufactures" *fresh* air by taking the gaseous impurities and odors out of *used* air.

Dorex Air Recovery has more than 20 years experience behind it. It forms an integral part of more than 10,000 air conditioning and ventilating systems. From these we find that every $100 invested in Dorex Air Recovery should save some $400 on original equipment; and every $1 spent for Dorex maintenance over the years should return a saving of $4 in operating costs.

Why not offer *your* clients these benefits? You'll make your job a lot easier. Let us send you, without obligation, full information about Dorex Air Recovery—how it works, who uses it, what you and your customers can expect from it. The coupon below clipped to your letterhead will bring our fact-packed bulletin: "How To Manufacture Fresh Air."
Connor Engineering Corp., Danbury, Conn.

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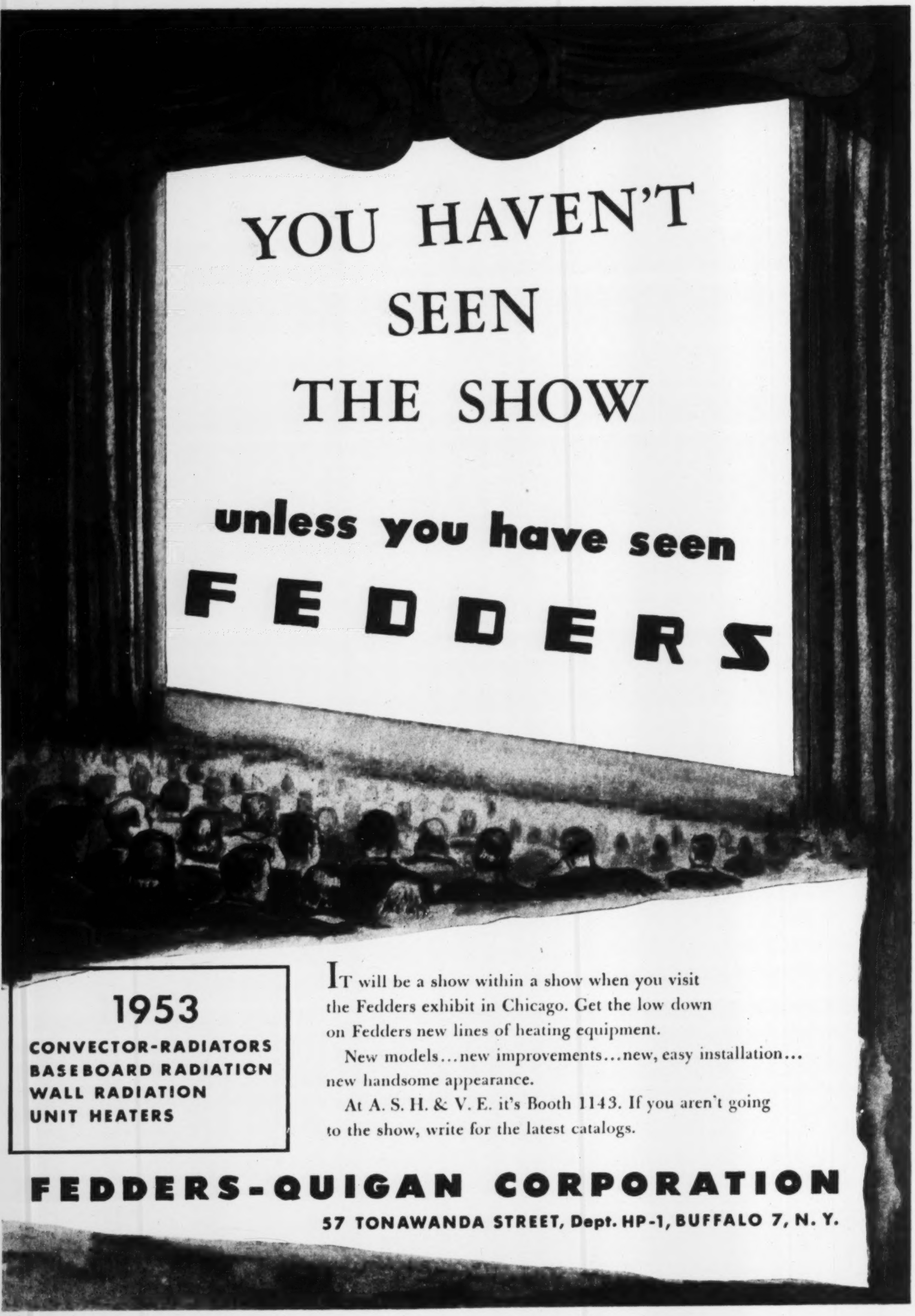

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BASEBOARD RADIATION
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UNIT HEATERS

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New models...new improvements...new, easy installation... new handsome appearance.

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THIS DIAGRAM SHOWS ACTUAL-SIZED DETAIL OF

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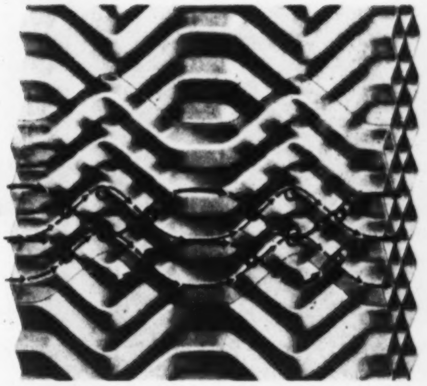
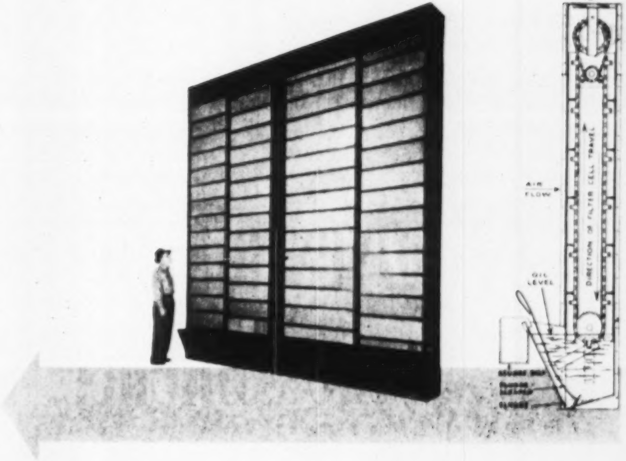


HIGH-EFFICIENCY LOW-RESISTANCE

MEDIA DESIGN

NON-CLOGGING, metal honey-comb filter media swirls the split air-stream through Continental filters with a surprisingly low resistance to air-flow. Turbulence of criss-crossed streams efficiently extracts dust by viscous impingement method.



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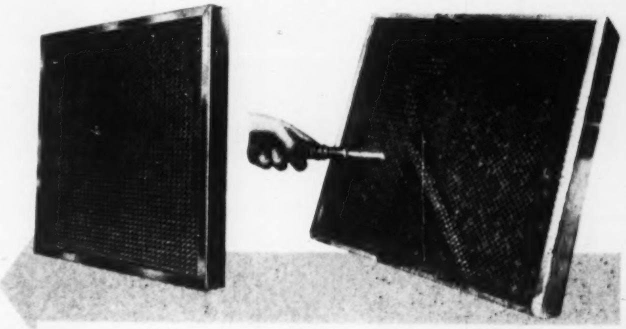
SELF-CLEANING AUTOMATICS

Ferris-wheel type of operation of the multi-celled filter curtain eliminates reversing direction of media in the leaving-air curtain. Thus, no dust can be blown back into the clean-air stream from the leaving air curtain. Patented media design and unique "soak-then-flush" action provide thorough self-cleaning.



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E·Z·WASH UNIT FILTERS

Same superior media design provides maximum efficiency with minimum resistance to air-flow in high-velocity reusable unit filters. Called E·Z·WASH because cold water from an ordinary garden hose under normal line pressure is all that is needed for easy, rapid and efficient cleaning. Easily re-oiled with handy E·Z·Oil spray bomb, with any commercial, air-operated oil-spray gun, or by dipping.

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CONTINENTAL AIR FILTERS Inc.

CONTINENTAL
E·Z Wash Unit Filters

GENTLEMEN: Please send the following:
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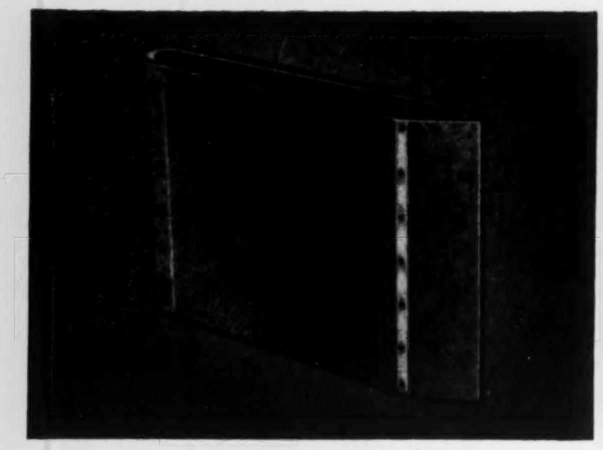
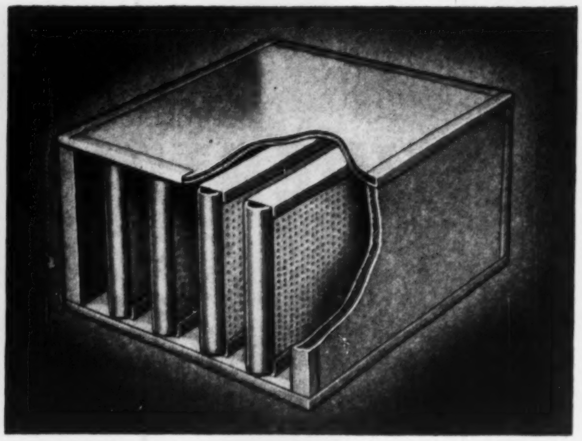


ISC "Soundmetal" Panel. Economical to install; fire and moisture resistant.



ISC "Sound Trap." Used on air intake side to eliminate excessive air noise.

ISC gives all air conditioning noise the "Silence Treatment"

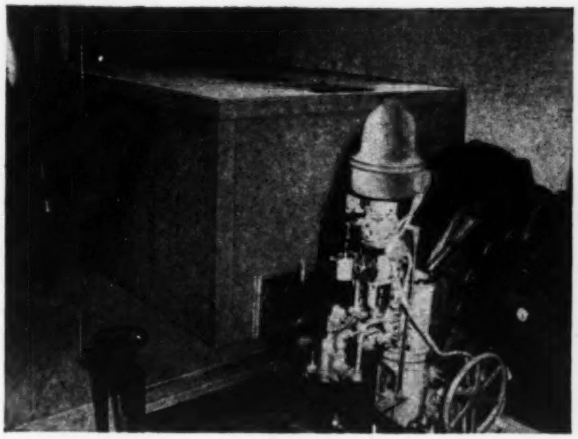
ISC does a complete job of quieting an air conditioning system because it gives attention to all of these individual noises:

1. **Fan and blower noise.**
2. **Air noise in cooling tower and ductwork.**
3. **Waterfall noise in cooling towers.**
4. **Compressor and other machinery noise.**

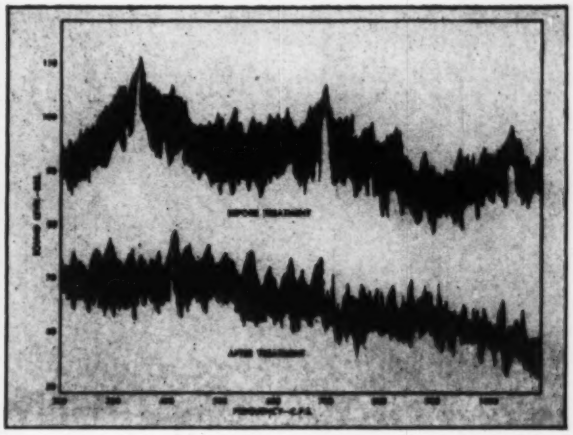
ISC "Soundmetal" panels, used in aircraft test cells to silence the largest jet engines, literally soak up noise. Made of heavy gauge sheet metal frames, with heavy gauge perforated faces and solid back surfaces, they are filled with sound-absorptive material, and are moisture resistant. They can be made of other materials such as galvanized steel, aluminum, copper or stainless steel as demanded by operating conditions.

ISC Sound Traps eliminate excessive air noise. Casings are made of "Soundmetal" panels, perforated inside and solid outside, and the air passage through the trap is divided into several channels by baffles, perforated on both sides. Used on the air intake of cooling towers, they are also used at the entrance to air distribution ducts to eliminate fan and machinery noise, and at the exhaust end of induced draft fans for combustion boilers.

ISC Sound Blanket enclosures are used to isolate compressor, pump, and other machinery noise. A tailor-made enclosure of "Soundmetal" panels is built around the compressor, or other machinery, to prevent carrying-over of machinery noise into the air stream and the ductwork itself. Easily removable panels permit access for maintenance, inspection, and adjustment. These enclosures are also in general use for other machinery which causes excessive noise.



ISC "Sound Blanket" Enclosure. Isolates compressor and other machinery noise.



Typical Cooling Tower Noise Spectrum, before and after sound treatment.

Noise suppression . . . is included in air conditioning specifications by leading engineers and architects. They know that cooling tower and other air conditioning system noise can mean loss of rental revenue, tenant and worker dissatisfaction and bad public relations. Cooling tower noise has resulted in injunctions which shut down the systems for indefinite periods when needed most. They also know that costs are less when work is done as part of the original installation.

Noise suppression was included in the specifications when the Empire State Building in New York City was air conditioned. The job was completely engineered by Industrial Sound Control, Inc., and includes intake sound-proofing, using ISC sound traps; an exhaust muffler of ISC "Soundmetal" panels around each blower; and a horizontal baffle, also composed of "Soundmetal" panels, over each blower.

Every project undertaken by ISC is individually engineered; every sound control device is designed and installed to meet the special problems encountered. All ISC methods are covered by patents controlled by Industrial Sound Control, Inc. Write today for free booklet, "Sound Facts"; or outline your specific problem.

Midwestern Distributor: Midwest Industrial Sound Control, Inc.
1455 North Pennsylvania Street, Indianapolis, Indiana.

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Industrial Sound Control Inc.

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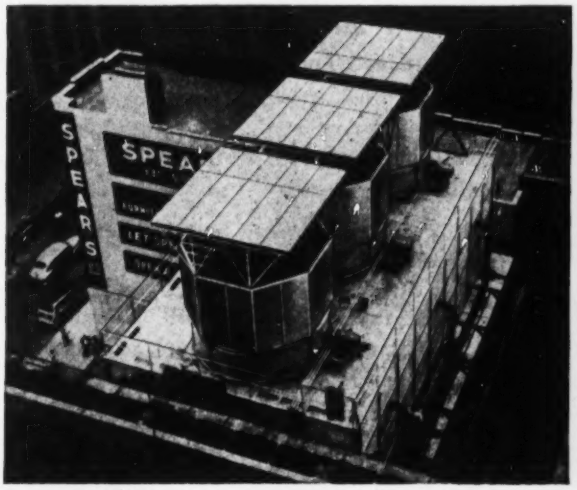
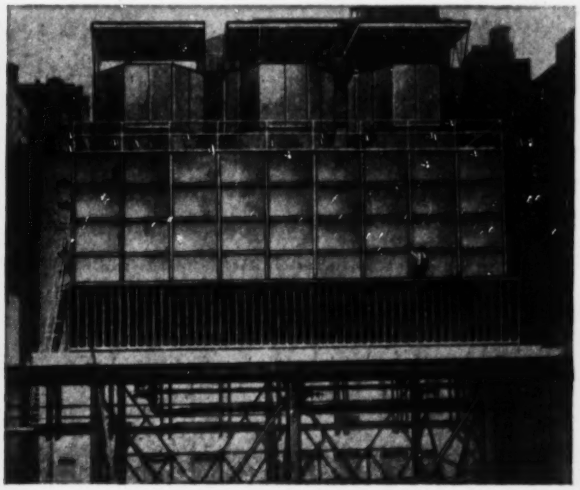
2119 SO. SEPULVEDA BLVD., LOS ANGELES, CALIF.

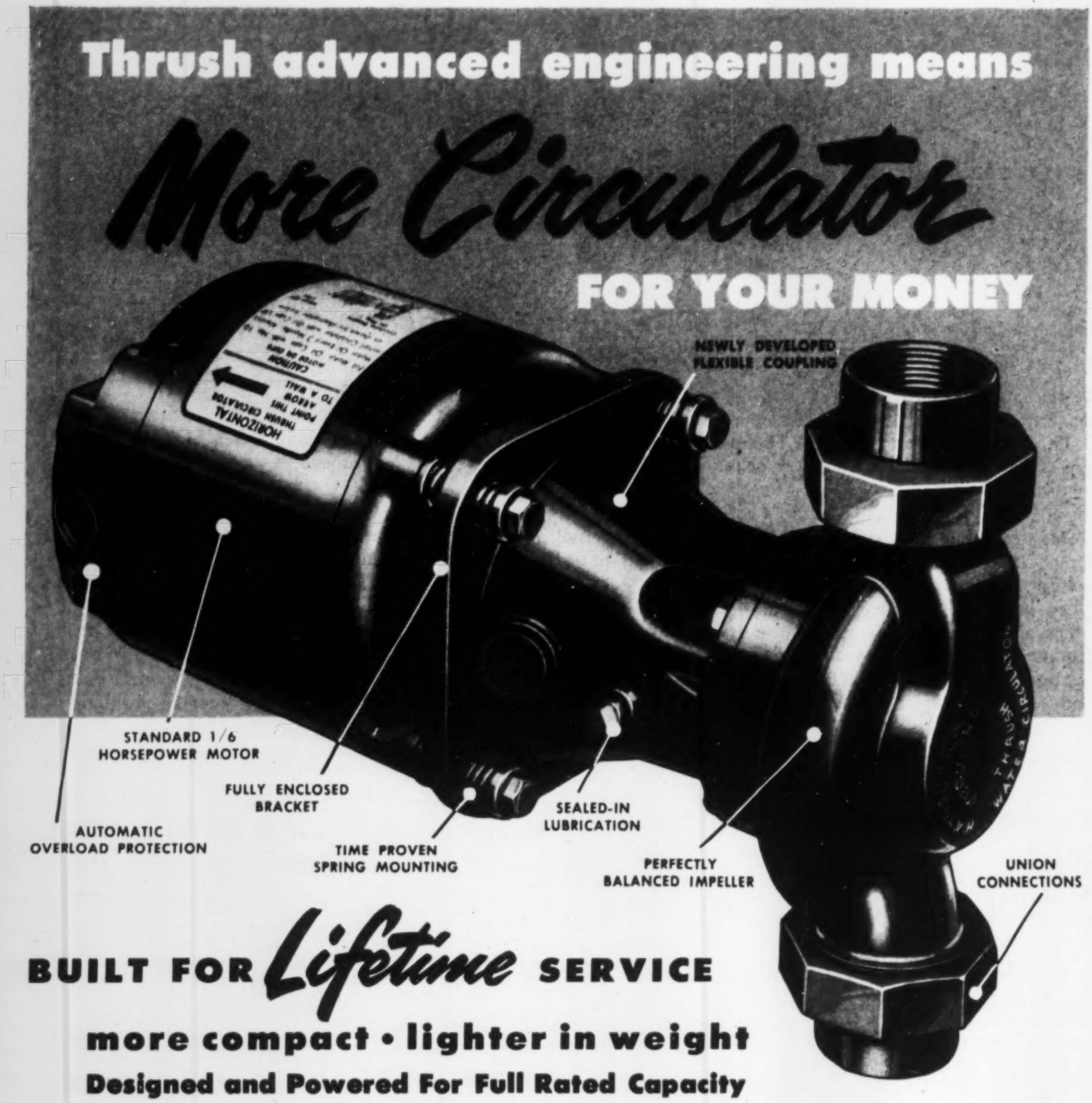
*Photos courtesy of Equipment Division, J. F. Pritchard & Co., Kansas City, Mo.

*Cooling Tower, Empire State Building, New York City, showing exhaust mufflers and horizontal noise baffles.



*View of Empire State Building's cooling tower showing vertical baffles of "Sound Trap" intake soundproofing.

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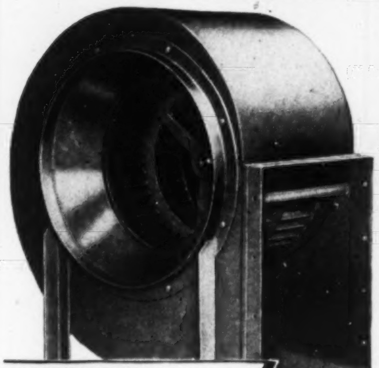
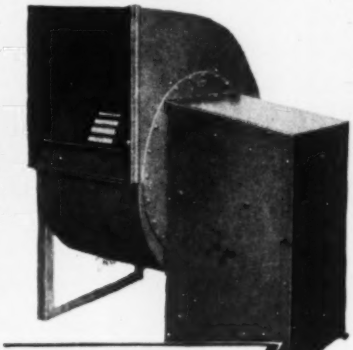
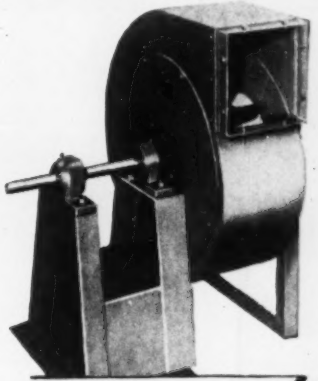


VENTILATING FANS
Equipped with forward or backward curved wheels — for Ventilating, Conditioning, Mechanical Draft.



VENT SETS
Belt or Direct-Driven, designed for applications requiring moderate air volumes.



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Fume exhaust, materials handling, high temperatures effectively handled with this radial-blade fan.

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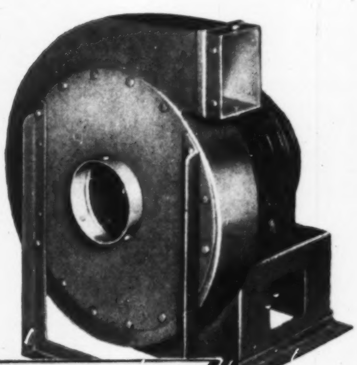
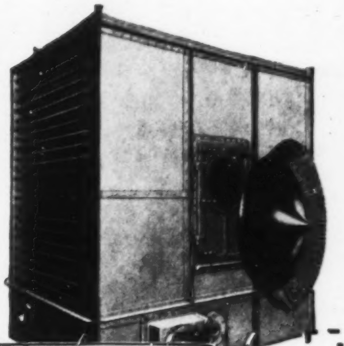


PRESSURE BLOWERS
For draft and conveying with moderate air volumes at relatively high pressures.



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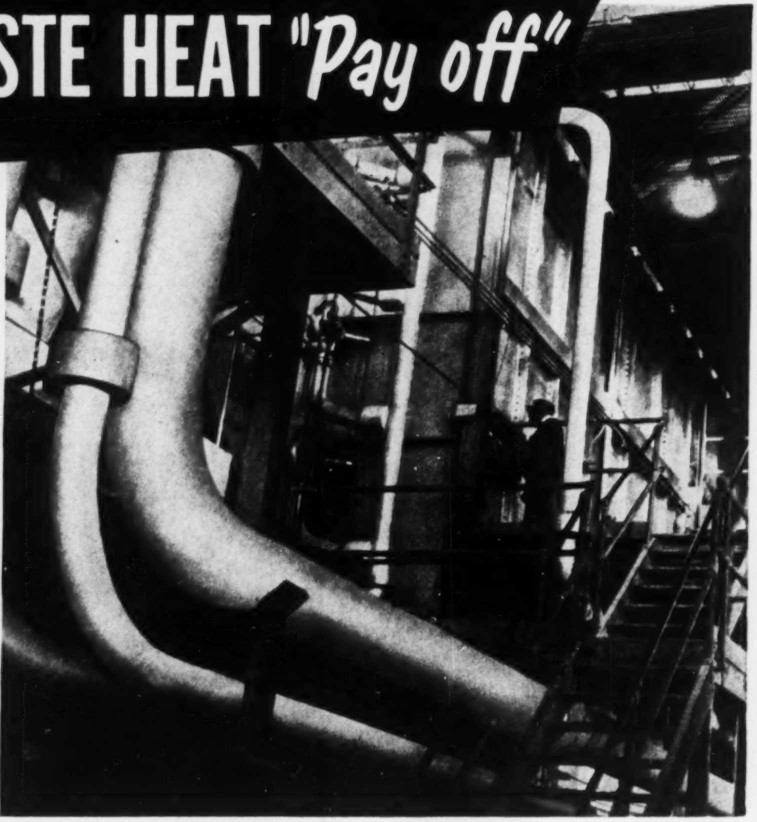

One of the East's large cement companies gets all the electric power it needs for plant operation by utilizing the waste heat from its cement kilns. This heat is first directed to a boiler which produces a continuous supply of 700°F. steam. This, in turn, is piped to a power-generating turbine—and that's where K&M insulations come in!

So that heat loss is held to a minimum, two effective K&M insulations have been used in combination on the main steam header: a 1½" layer of "Featherweight" 85% Magnesia over a 1½" layer of Hy-Temp insulation. For two smaller boiler-feed water lines, a 1½" layer of "Featherweight" 85% Magnesia is sufficient. All pipes have been finished with a canvas jacket and painted.

K&M "Featherweight" 85% Magnesia is a versatile, dependable, economical insulation for applications up to 600°F. Combined with Hy-Temp, it is efficient on installations having temperatures up to 1900°F. Both materials are supplied in a wide variety of forms and thicknesses.

Your K&M distributor, an experienced applicator, will gladly answer your questions about these products and their uses. Call on him soon, or write to us for complete information.

Nature made Asbestos . . . Keasbey & Mattison has made it serve mankind since 1873

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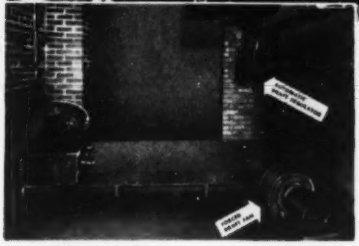
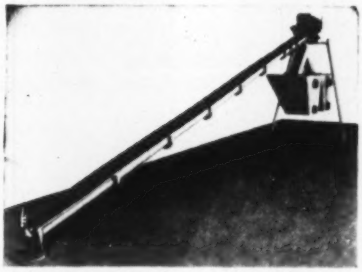
LOOKING FOR WAYS TO CUT COSTS?

Your only answer may be in using your labor more efficiently..

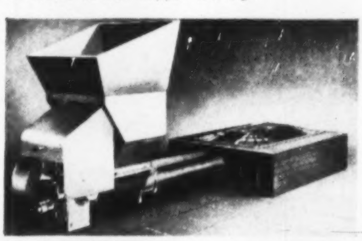
1. No More Shoveling, Men Are Free For Other Duties... A Tremendous Saving In Man-Power Alone! Then Consider All The Other Low-Cost Advantages....
2. SIDE-DUMP ASH PLATES, AN OPTIONAL FEATURE OF CANTON BINFEEDS, ELIMINATE SMOKE, FUMES, DUST IN BOILER ROOM. ASH SPRAY PIPES SIMPLIFY CLEANING.
3. COMPLETE CONTROL PANEL ENGINEERED FOR THE JOB IS WIRED AND TESTED AT THE FACTORY — PAYS FOR ITSELF BY SIMPLIFYING WIRING ON THE JOB SITE AND GUARANTEEING PROPER CONTROL OPERATION. MODULATING COMBUSTION AND DRAFT CONTROLS ARE AVAILABLE ON ALL MODELS.
4. AS AUTOMATIC NOW, AS GAS OR OIL.
5. CANTON BINFEED STOKERS HOLD STEAM PRESSURES CONSTANT, REDUCE FUEL COSTS BY PRODUCING MORE HEAT FROM THE FUEL; ALLOW CHEAPER GRADES AND SIZES OF COAL TO BE USED EFFICIENTLY.
6. NO NEED FOR SEPARATE INCINERATOR WITH CANTON SIDE DUMP BINFEEDS, AS THEY PROVIDE FOR BURNING REFUSE.
7. FLAT PLATE TOP OF WORM CASING CAN BE INSTALLED AT FLOOR LEVEL, WHEN DESIRABLE, FOR TRUCKS OR TRAFFIC TO PASS OVER.



New Canton Binfeed with coal conveyor rear of boiler. Note fan and automatic draft regulator are also at rear of boiler, out of the way.



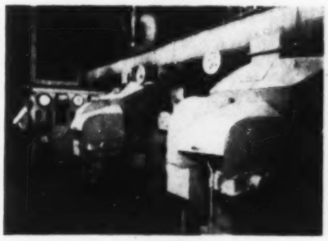
Flo-Tube Coal Conveyors fill one or more hoppers direct from bin or pile. Are also used horizontally as in picture at right, with gate valves to control hopper feeding.



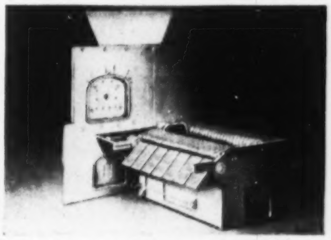
For larger Boilers, ample active burning area is provided by Canton's newest Tuyere design with measured air graduation and fin-cooling ribs. Dead plate type illustrated here . . . also available in side ash dumping type.

LOOK AT THE NEW CANTON STOKER DEVELOPMENTS

Binfeed Stokers cut costs immediately for every heat and power demand by allowing more efficient use of labor. High wages, going higher, have speeded up the need for automatic handling of coal—the lowest price fuel. It will pay to look into the new developments by Canton Stoker, specialists in COAL FIRING, HANDLING and CONTROL equipment. Representatives in principal cities of the U. S. have complete information, or write direct.



Ever see a neater installation? This photo is NOT RETOUCHED. It is Canton Stoker installation, St. Mary's Hospital, Niagara Falls, New York. Hoppers are fed horizontally, direct from bin by screw conveyors.



New Canton "SINGLE-SIDE-DUMP" model, engineered and built for narrow boilers.

"TURBO-AIRE" JETS — for smoke abatement, firing efficiency.

WRITE FOR NEWEST BROCHURE **on Binfeed Stokers. It contains blue-prints and plan of a model stoker installation. A great help in planning or remodeling.**

CANTON STOKERS

CANTON STOKER CORPORATION

2400 ANDREW PLACE S. W. CANTON, OHIO

LOW TEMPERATURE BRAZING news
Issued by Handy & Harman 82 Fulton St., New York 38, N.Y.
of EASY-FLO and SIL-FOS Applications and Developments
Heating Methods issue
How to heat
?
IF YOU BRAZE

...THIS NEW BULLETIN WILL HELP YOU PICK THE RIGHT HEATING METHOD

What heating method to use—is a most important question when you're planning a brazing job—because the answer is a main factor in determining joint quality and the time, labor and cost on the job.

With EASY-FLO and SIL-FOS you can *take your pick* of heating methods because these low-temperature silver brazing alloys work well with all. The bulletin will help you make the right choice. It outlines the different heating methods and the type of jobs for which each is best suited.

AT YOUR CALL
expert aid in applying
EASY-FLO and SIL-FOS
brazing to your metal joining
from joint design into
production. No obligation.
Ask for a
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WRITE TODAY FOR A FREE COPY
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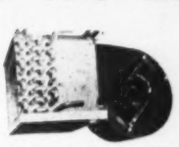
PEOPLE ARE TALKING ABOUT SPOTAIRE!

NO NOISE! NO VIBRATION! BUT IT'S RUNNING!

Investigate Drayer-Hanson's Line of Air Conditioning Equipment at the International Heating, Ventilating and Air Conditioning Show.



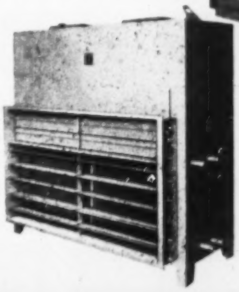
Spotaire Series HRC for concealed installations.

Below — Spotaire Series VRC room air conditioning unit, furnished in 3 sizes.

People are bound to talk about the d-h line of Spotaire room unit air conditioners once they view them in operation. Anyone watching the Spotaire series HRC or VRC units delivering conditioned air efficiently, smoothly and without vibration will admit that Drayer-Hanson has found the answer to economical true air conditioning for motels, hotels, apartments, offices, hospitals, residences, etc.

See these units on display in the Drayer-Hanson booth number 2-524 at the International Exposition in Chicago, beginning January 26th. Ask about them! Watch them in operation! Feel the air delivered, but don't try to hear them. The Spotaire slogan, "QUIET BEYOND BELIEF!" is justly earned.

Look us up when you get to Chicago. We'll be at the Amphitheatre.



Drayer-Hanson HHV Series air conditioning unit.

Box 2215, Terminal Annex, drayer-hanson INCORPORATED Los Angeles 54, Calif.

NEW

HEAT SAVING EFFICIENCY

with Mundet 85% Magnesia

Send for Complete New Catalog

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85% MAGNESIA
HEAT insulation
Engineering and Specification Data
Mundet Cork Corporation

Mundet district offices are conveniently located coast-to-coast.

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Mundet Cork & Insulation, Ltd.
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Now available in pipe covering and block insulation, Mundet Custom-Molded 85% Magnesia permits new heat-saving efficiency.

You benefit from these advantages when you use Mundet 85% Magnesia Insulation.

- ***Easier to Apply***
  It cuts easily and cleanly, even without canvas support. No chipping, crumbling or "powdering." Blocks score cleanly.
- ***Lighter Weight***
  Only 11 lbs. per cubic foot density. Even larger sizes and thicknesses are easy for one man to handle.
- ***Controlled Uniformity***
  Precision manufacture on the latest type of equipment insures uniform standards.
- ***More Durable***
  Greater "ductile strength" is built into the insulation. It does not "powder," settle or disintegrate even with heavy vibration. It withstands handling and may be removed and reapplied if necessary.
- ***Does not Shrink or Warp***
  Steam or water leakage does not affect it. It does not shrink or warp even after soaking.
- ***Attractive Smooth Finish***
  No unsightly, inefficient "bagging." Mundet 85% Magnesia insulation retains its neat appearance and effectiveness.
- ***Precision Pipe Fit***
  No spaces are left for the escape of heat. The whole heated surface is snugly enclosed.

Write for specification information and recommendations. Mundet Cork Corporation, Insulation Division, 7113 Tonnelle Avenue, North Bergen, N. J.

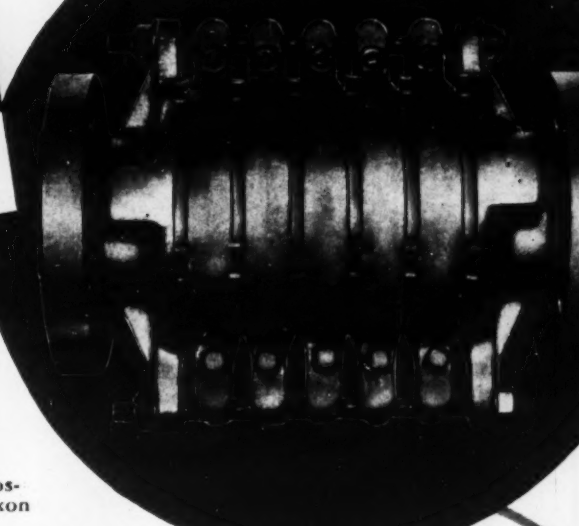
INSULATION FOR HIGH AND LOW TEMPERATURE

Now you can have GREATER PIPE LINE MOTION CONTROL IN A MORE COMPACT, LESS COSTLY EXPANSION JOINT!

THE NEW

FLEXON

EXPANSION JOINT



Continuing research and development at Flexonics Corporation have now made it possible to offer design improvements in Flexon Expansion Joints that provide three basic advantages:

1. The face-to-face (over-all) dimension of a joint to handle a given amount of expansion has been reduced.
2. The reduction in size results in a lower expansion joint cost to handle a given amount of motion.
3. Exhaustive tests prove that these joints provide a maximum of motion commensurate with optimum life.

Coupled with such accepted advantages as compactness, ease of installation and freedom from maintenance, these additional advantages make Flexon Expansion Joints the most satisfactory method of controlling pipe line motion for the majority of installations.

Complete specifications are given in the new Flexon Expansion Joint Bulletin. Check this data before you select or specify expansion joints for your plant. Write for your copy, today.

THREE TYPES AVAILABLE

FREE FLEXING—Available in sizes from 3" through 48" I.D. in copper or stainless steel. Suitable for pressures to 30 psi, temperatures from minus 100°F. to 800°F.

CONTROLLED FLEXING—(Illustrated above) Available in sizes from 3" through 48" I.D. in copper or stainless steel. Suitable for pressures to 300 psi, temperatures from minus 100°F. to 800°F.

FLEXONIFLEX—Integral ring type. Available in sizes from $\frac{1}{2}$" pipe through 6" pipe. Suitable for pressures to 5500 psi, temperatures from minus 400°F. to 1600°F.

Flexonics Corporation

EXPANSION JOINT DIVISION
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Flexon identifies products of Flexonics Corporation that have served industry for over 50 years.

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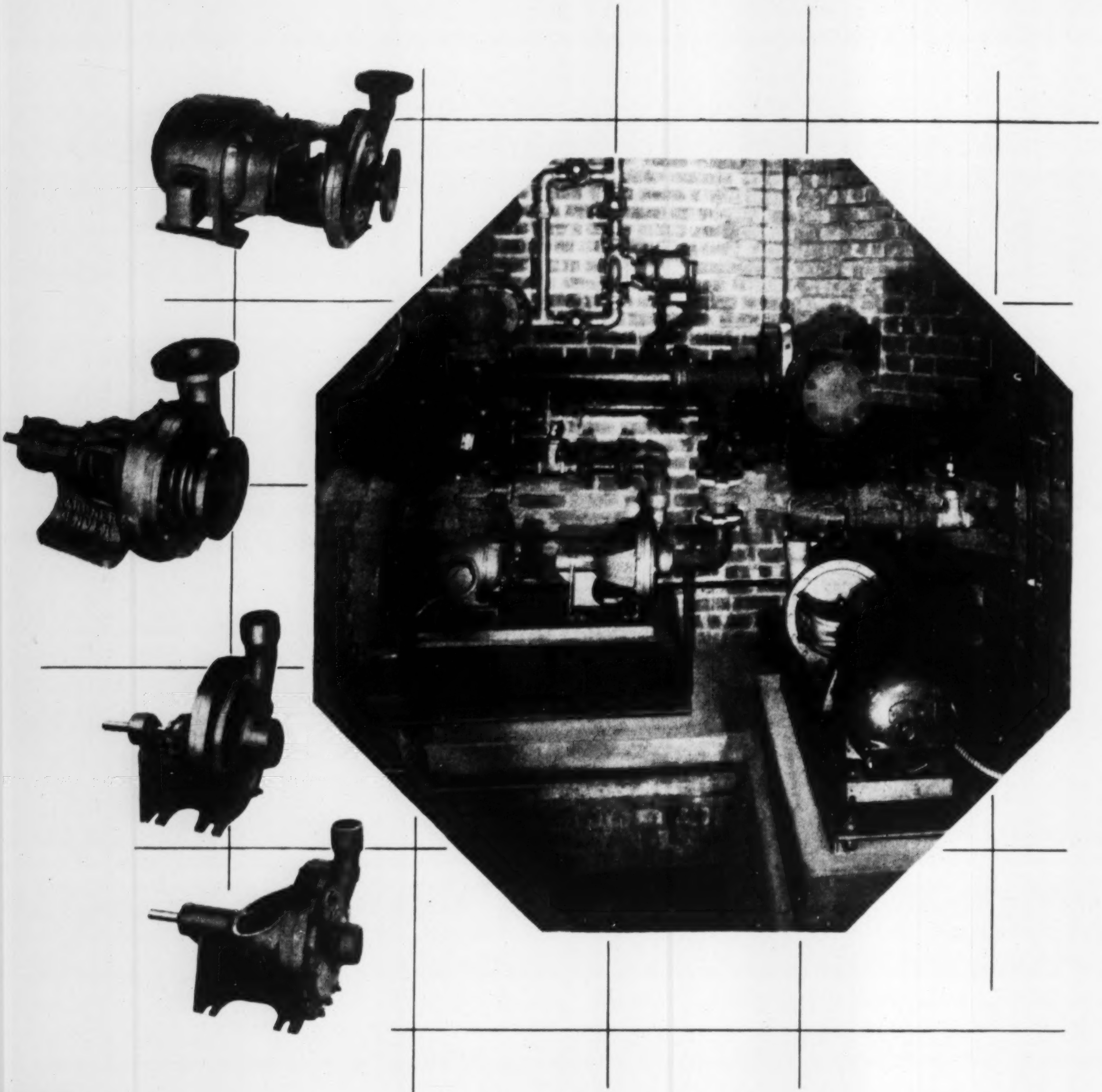

owners will remember you for the pumps they can forget!

Gardner-Denver Centrifugals go into the system to stay . . . keep pumping costs low.

Send today for the Gardner-Denver pump specifications.

GARDNER-DENVER SINCE 1859
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THE QUALITY LEADER IN COMPRESSORS, PUMPS AND ROCK DRILLS

FULL LINE . .
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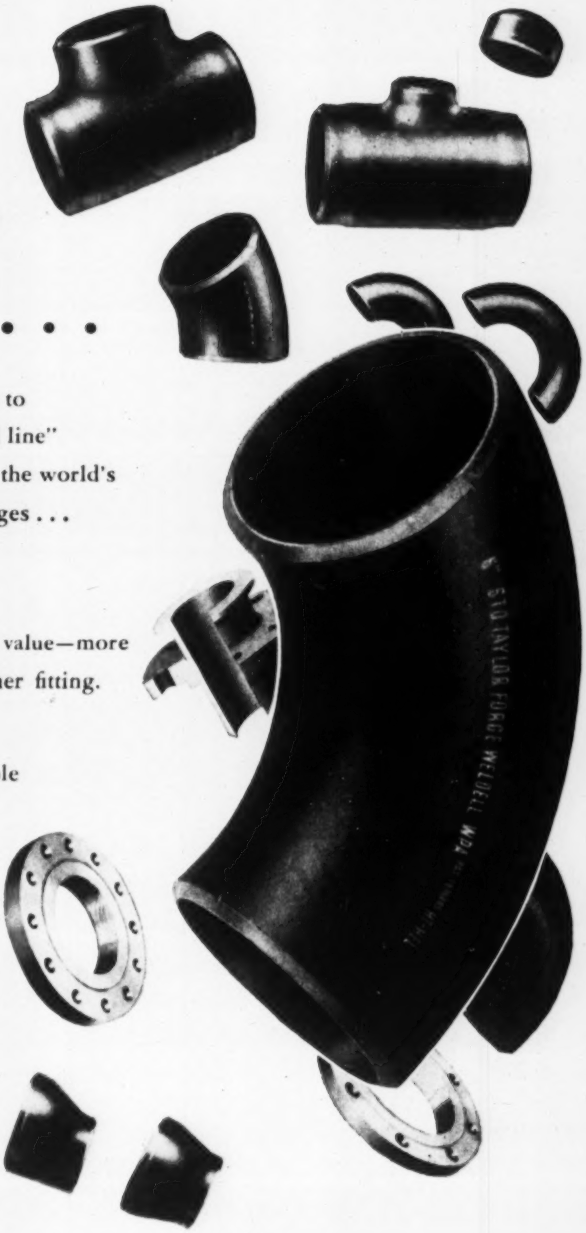

We have repeatedly urged users of welding fittings to accept no less than the *full line.* When we say "full line" we don't just mean its *completeness* . . . though it *is* the world's most complete line of forged steel fittings and flanges . . . and it *does* contain the widest range of types, sizes, weights and materials.

When we say "full line" we mean full value—extra value—more and better features than can be found in any other fitting.

The technical brains and forging skills which conceived these extra values continue to be available to you through the Taylor Forge organization, and through the Taylor Forge distributor who is your industrial neighbor.

Since Taylor Forge welding fittings "have everything," why compromise on less than the best?

Taylor Spiral-Weld Pipe The strongest pipe of its weight, this light-walled Spiral-Weld pipe, will handle a large percentage of the jobs customarily assigned to heavy pipe — handle them with strength to spare and at a big saving. Sizes, 6" through 36"; wall thickness, 14 through ¼", lengths to 40 ft. or longer.

Taylor Forge Electric-Weld Pipe Electric-welded by special Taylor Forge processes, the seams of this "O.D." pipe are as strong as the pipe metal itself. Sizes, 20" through 96"; thicknesses from ⅜" through 1-¼" and heavier.

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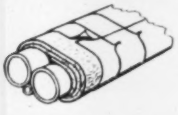
How to wrap up a tough insulating job... in a hurry!

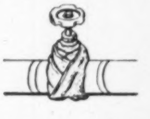
MICROLITE *Glass Fiber Insulating Wool* goes around this air conditioning duct with the greatest of ease. The men simply snip off a section of the feather-light blanket, pull it snugly around the duct, and secure it with glass tying cord. A single, simple wrap-around operation—and the duct is well insulated against heat loss or gain. Microlite comes to you in resilient blankets up to 72 inches wide, 200 feet long, 3 inches thick, compressed in easily-stored rolls.

You can't conscientiously proceed with any insulating job until you've investigated Microlite, a product of Glass Fibers' exclusive electronic-extrusion process. Write for the facts. Glass Fibers Inc., 1810 Madison Avenue, Toledo 2, Ohio.

MICROLITE *insulates effectively against heat transfer.*
MICROLITE *is pleasant to handle, cuts with scissors.*

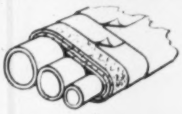


STEAM-TRACER LINES

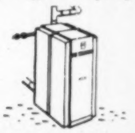


VALVES AND FITTINGS

MICROLITE *weighs as little as ½-pound per cubic foot.*
MICROLITE *compresses readily, springs back fully.*

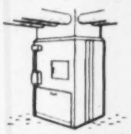


NESTED PIPES

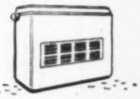


DOMESTIC BOILER

MICROLITE *is shipped in space-saving compressed rolls.*
MICROLITE *is an excellent absorber of unwanted noise.*



WARM AIR FURNACE



AIR CONDITIONER

MICROLITE *is inorganic, resists fire and moisture.*
MICROLITE *is tough, withstands rough handling.*

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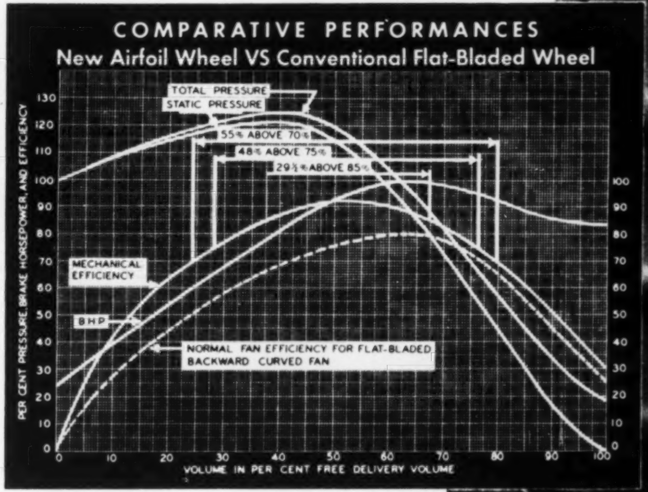
First Major Advancement
in 15 Years at BOOTH 1307



Here's why new "CHICAGO" AIRFOIL is the QUIETEST, MOST EFFICENT Fan

REVOLUTIONARY NEW AERODYNAMIC BLADE DESIGN

the only really new improvement since the original development of the backward curve non-overloading type fan. Meets *all* normal heating, ventilating and air conditioning requirements *plus* high pressure ventilating systems *plus* induced and forced draft applications.

EXCLUSIVE hollow-sectioned airfoil blades of this backward curve type wheel provide the greatest volume and the smoothest flow of air possible at an unmatched noise level.
Operating efficiencies in excess of 90%.
Steep pressure characteristic curves.
Noise level ratings lower than flat-bladed backward curve fans.

CERTIFIED ratings. All drives, directions of rotation and discharge. 600 to 750,000 cfm. 1/8 to 16" sp. Class 1 to 4 construction. Wheels 12¼ to 132" diameter.

FREE
Write for Bulletin A-101 — complete ratings and specifications, or phone nearest "Chicago" Agent.

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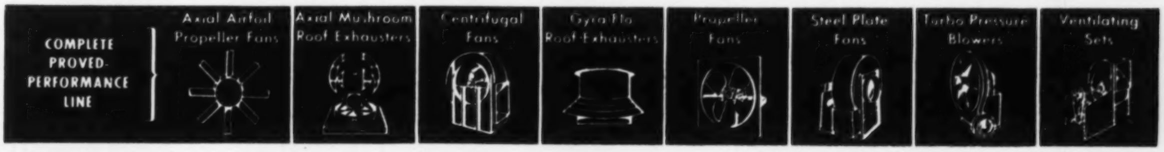
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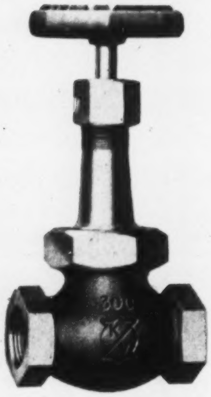
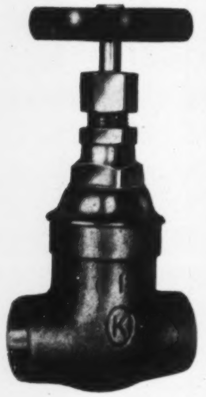
The complete KENNEDY line is

JOB-FITTED to help you select the right valve for every job

IRON-BODY VALVES. Gate, globe, angle and check. Working pressures from 25 lbs. through 800 lbs. Sizes from 2" through 60". Bronze-mounted or all iron, available in a wide variety of disc and stem designs and special construction features.



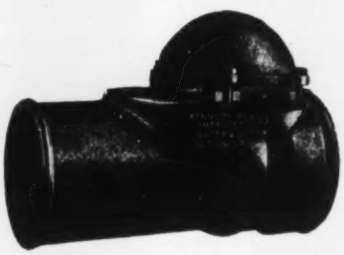
BRONZE VALVES. Gate, globe, angle, check and radiator valves. Working pressures from 125 lbs. through 300 lbs. Complete range of sizes from 1/4" through 3", some through 6", in all popular disc designs. Both Inside Screw and O. S. & Y. types.



LOW-PRESSURE BRONZE VALVES. Gate, globe, angle, check and radiator valves. Exceptionally sturdy construction. Gate valves up to 3". Globe, angle and radiator valves to 2". All available with screwed ends, some available with solder joint ends.

CAST-IRON PIPE FITTINGS. Full line of cast-iron screwed fittings, standard and extra heavy; flanged fittings and flanges, standard and extra heavy; drainage fittings; Underwriters' Approved sprinkler fittings. Individually tested and inspected.

MALLEABLE-IRON AND BRONZE PIPE FITTINGS. Complete line of malleables in a tough, close-grained iron with a tensile strength of 43,000 lbs. p.s.i. Full line of bronze fittings, individually air-tested and inspected for complete on-the-job dependability.



KENNEDY-PENNIE BACKWATER VALVE. Provides a gravity-operated, positive-acting seal against backwater, sewer gas and vermin. Can be easily counter-balanced for vertical or inclined operation. Easily installed. Available with bell inlet, spigot outlet.

KENNEDY
JOB-FITTED
VALVES

THE KENNEDY VALVE MFG. CO.
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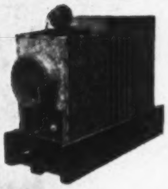
VALVES · PIPE FITTINGS · FIRE HYDRANTS

Induced Draft



Horizontal Draft
(Package)

Atmospheric Spray

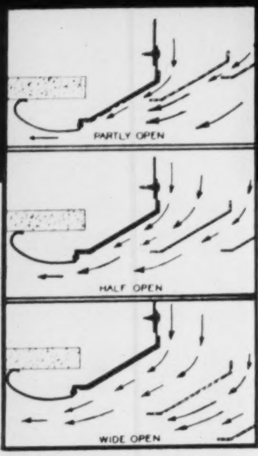
THE *Leader*
All Ways
IN *Fine*
Cooling Towers

54-YEAR
RECORD
of
L-H
INSTALLATIONS

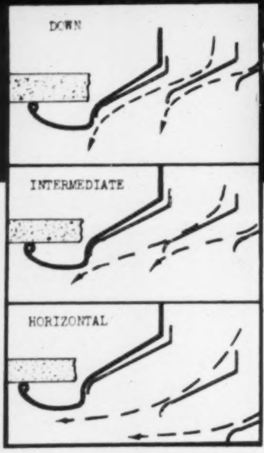
**An Unmatched
Experience Record
as Exclusive
Builders of the
World's Finest Cooling Towers**

LILIE-HOFFMANN
Cooling Towers
4239 DUNCAN AVE. • ST. LOUIS, MO

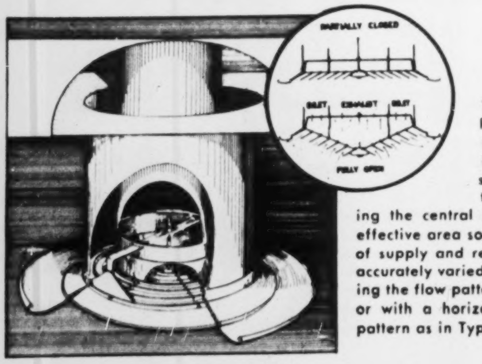
FLEXIFLO CEILING DIFFUSERS



Type R, for cooling, gives a constant flow pattern, no matter what the opening.



Type V, for cooling or heating, with its special blades, permits change of flow pattern from horizontal to vertical.



Type CH, for heating, ventilating or cooling, is a combination supply and return outlet. Turning the central screw alters the effective area so that the volume of supply and return air can be accurately varied, without changing the flow pattern as in Type R, or with a horizontal to vertical pattern as in Type V.

for COOLING • VENTILATING AND HEATING

Enthusiastically received as a solution to many problems of air diffusion heretofore unsolved by other types, the Flexiflo meets the long-felt want for an air outlet of better design with complete, easy adjustability of air output and diffusion pattern.

The Flexiflo provides larger effective area for the required neck area than is available on any other types. Hence, it can handle larger volumes of air. The Flexiflo (Type R) provides infinitely variable air delivery without changing characteristic air pattern.

Exclusive in the Flexiflo are the built-in equalizing deflectors which are easy to adjust after installation.

The Flexiflo is equally efficient, whether installed on the ceiling or on exposed ducts. Wide range of capacities. Streamlined — beautiful, yet inconspicuous — rugged — the Flexiflo Diffuser truly helps make your heating or air conditioning installation a better engineered job.

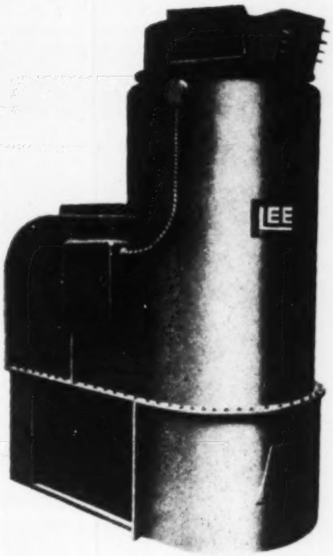
Write for the Flexiflo Engineering Manual and Prices.

FLEXIFLO

UNIVERSAL DIFFUSER CORP.

892 WHITTIER STREET • NEW YORK 59, N. Y.

LEE
HEATERS SINCE 1918



- Cyclonic flow heat exchanger of heavy #10 Ga. material. Whirling high velocity air scrubs out all the heat.
- Employs one blower properly sized for slow speed, quiet and efficient operation. Short shaft eliminates troublesome blower and bearing maintenance. Single fan facilitates adjusting for any extreme static requirements when ducts are employed.
- Separate driven exhauster means heater can not blow cold air. Requires only vent stack and allows for a purging cycle.
- Heater has stainless steel combustion chamber with refractory lining optional.
- Circular #18 Ga. outer casing reinforced with a cooling inner baffle.
- Adjustable outlets may be moved to suit conditions.
- Lee engineered firing equipment with automatic controls and an electronic eye for safe operation. Combustion safeguards for oil, gas or combination.
- Totally enclosed control panel makes electrical controls dustproof and safe.
- Streamlined modern design coupled with Lee's famous ruggedness makes this heater a "stand out" in any location.
- Completely shop assembled with standardized components making for easy replacement of parts. No expensive servicemen or labor to put a long used heater back in service. Cuts maintenance to the very minimum.
- To put a new heater in service requires only: 1 – A vent stack to atmosphere; 2 – Connection of electric service wires to control panel; 3 – Connection of fuel lines to burner.
- Heater is light weight for universal mounting — floor mounted or portable and suspended, either horizontal or inverted.
- Efficiency fuel to air will be 80% or more.

series UD

UNIVERSAL DUTY
SPACE HEATER

rugged-efficient-versatile

construction

The Universal Duty Heater has been designed to meet a growing demand for a low cost, quiet operating, universally adaptable, economical and efficient, light weight "Unit" Heater for commercial and light industrial applications. The slow speed fan requiring less horsepower and the modern design, result in quiet and efficient operation. These heaters are completely shop assembled and flame tested and are unconditionally guaranteed for one year.

standard models

Model UDA — Stoker fired — Anthracite coal
Model UDB — Stoker fired — Bituminous coal
Model UDLO — Light oil fired
Model UDGA — Gas fired
Model UDHO — Heavy oil fired
Model UDOG — Combustion light oil & gas.

standard equipment and controls

Separate induced draft fan
Stainless steel or refractory combustion chamber

LEE
HEATERS SINCE 1918

SPECIFY LEE the completely engineered heater
LEE CORPORATION
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Manufacturers and Designers of Complete Line of Industrial and Commercial Warm Air Heaters
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Monarch

SPRAY NOZZLES

for

AIR WASHERS . . . COOLING TOWERS

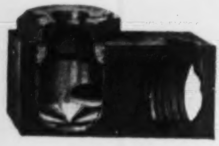


Fig. 631

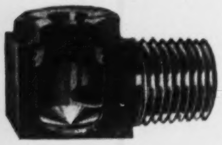


Fig. 629

These are "non-clogging" nozzles with a single large tangential lead hole to the swirl chamber that will never clog from any impurities small enough to pass through the orifice. Swirl chamber is conical on both ends and pivots liquid like a top to produce an exceptionally fine, evenly distributed, balanced spray of about 80° included angle. Wider spray angles up to 130° can be furnished to order.

Standard material Brass. Also available in Stainless Steel and Monel. Pipe sizes from 1/8" to 1". 1/4" size is 1-5/16" long and made from 5/8" square stock.

GALLONS PER HOUR

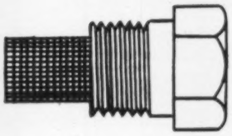
Nozzle No.	Lbs. Operating Pressure				
	25	40	60	80	100
1.35		.57	.69	.83	.92
1.65		.75	.89	.99	1.12
2.00		.94	1.14	1.28	1.40
2.50		1.13	1.45	1.64	1.86
3.00	1.03	1.39	1.62	1.85	1.95
3.50	1.36	1.77	2.11	2.46	2.80
4.00	1.56	2.00	2.42	2.77	3.16
4.50	1.86	2.32	2.77	3.21	3.68
5.00	2.20	2.88	3.57	4.09	4.59
5.50	2.22	2.96	3.75	4.31	4.78
6.00	2.55	3.35	4.01	4.78	5.23
7.00	2.90	3.91	4.60	5.17	6.00

HUMIDIFIERS . . . . . . AIR CONDITIONERS

The H-261 and F-80 brass water nozzles produce the finest, softest, fog-like spray possible with low direct pressure only. Popular sizes are nozzle #3.00 and #5.00 tested either 80° or 120° at 25 pounds.

All Brass construction with 120 mesh Monel screen strainers and 1/8" or 1/4" female or 1/4" male pipe connection in the F-80 and 1/4" male only in the H-261. The H-261 is 1-3/8" overall and the F-80, 1-7/8".

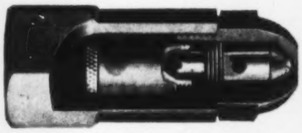
Fig. H-261



CAPACITIES: GALLONS PER HOUR

Sizes			Lbs. Operating Pressure					
Pipe	Orifice	Lead	10	20	30	40	60	100
1/8" OR 1/4"	69	69			2.9	3.3	4.0	5.1
	61	61		4.0	5.0	5.5	7.0	8.7
	61	53	4.4	6.2	7.5	8.3	10.3	13.0
	53	53	5.8	8.2	9.8	10.9	14.1	17.3
	49	49	9.1	11.1	13.2	15.0	19.5	24.6
	3/32"	3/32"	11.8	16.6	20.4	23.4	29.0	36.5
	1/8"	3/32"	19.5	27.6	33.3	39.1	49.0	60.0
	1/8"	1/8"	24.3	34.6	42.8	50.0	64.0	78.5
	11/64"	1/8"	31.5	46.1	57.0	64.1	81.9	105
	3/16"	5/32"	52.2	75.0	92.5	109	138	189
1/4"	7/32"	3/16"	78.0	112	138	163	205	257
	7/32"	7/32"	82.0	121	152	180	225	300

Fig. F-80



OIL BURNERS

Monarch Stainless Steel Nozzles for high pressure gun-type oil burners are the Industry yardstick for nozzle performance. Each nozzle individually tested for capacity, spray angle and uniformity of spray on No. 2 fuel oil weighing 7.16 pounds per gallon at 74°F. and 34 S. S. U. viscosity at 100°F. Standard spray angles are 30°, 45°, 60°, 70° and 80° in small sizes.

Standard capacity sizes (GPH at 100 psi.): .60, .75, .85, 1.00, 1.20, 1.25, 1.35, 1.50, 1.65, 1.75, 2.00, 2.25, 2.50, 3.00, 3.50, 4.00, 4.50, 5.00, 5.50, 6.00, 6.50, 7.00, 7.50, 8.30, 9.50, 10.50, 12.00, 13.80, 15.30, 17.50, 19.50, 21.50, 24.00, 28.00, 30.00 to 60.0 in 5.00 GPH steps and 60.0 to 100.0 in 10.00 GPH steps.

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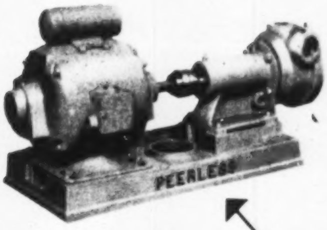
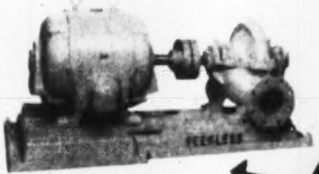
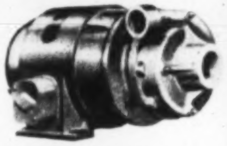


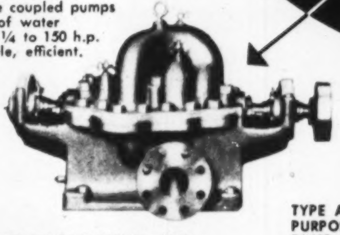
TURBINE VANE TYPE PUMPS—For pumping hot and cold, clear and vaporous liquids. Close- and flexible-coupled types. Standard and self-priming models.



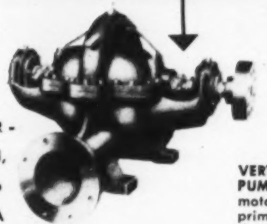
TYPE AS—NEW GENERAL PURPOSE SPLIT-CASE PUMP—Modern design and construction. Designed with and for a mechanical shaft seal. Sizes: 1½ through 4 inches. Capacity: up to 750 gpm. Heads: up to 230 ft.



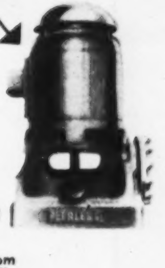
TYPE PE "The Fluidyne Line"—Economical, end-suction, face mount and flexible coupled pumps for widest range of water handling services. ¼ to 150 h.p. Economical, durable, efficient.



TYPE TU—MULTI-STAGE PUMP—For high pressure pumping. 2, 3, 4 and 5 stage pumps are available. Horizontal split case design. For capacities up to 3500 gpm and for heads up to 1600 feet.



TYPE A—ALL PURPOSE WATER PUMP—Single stage, horizontal, split-case pump. Capacities up to 70,000 gpm. All types of drive. A quality pump throughout.



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☐ TYPE A ALL-PURPOSE PUMPS Bulletin B-1300
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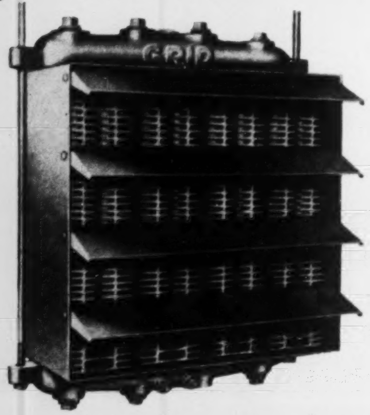
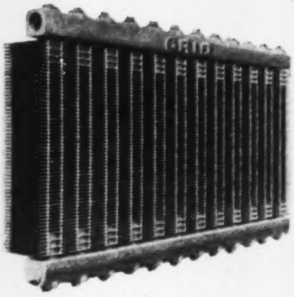


GRID Unit Heaters are designed for low outlet temperatures and greater air delivery to the floor line—not the ceiling—and will safely withstand steam pressure up to 250 P.S.I. without reducing valves. They save fuel cost, too, because they provide heat where it is most needed—to the working zone. Careful selection of fans and motor speeds eliminates stratification of warm air at ceiling level.

No other type unit heater has their lasting qualities . . . they will have the same high efficiency after years of operation as the day they were installed.



GRID Blast sections have the same high efficiency and lasting qualities as GRID Unit Heaters . . . no tortuous air passages . . . complete absence of ruptures, strains, and warping . . . guaranteed for steam pressures up to 250 lbs.

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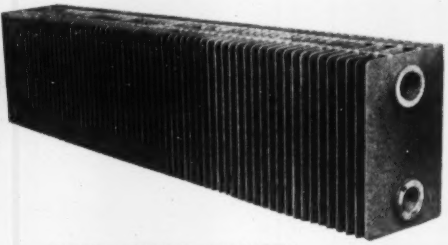
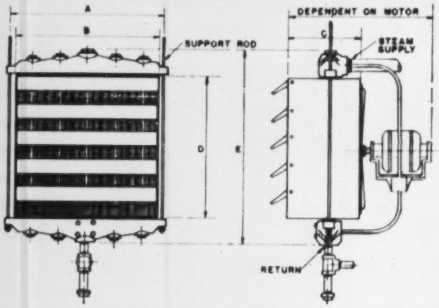
ONE PIECE CONSTRUCTION – No Soldered, Brazed, Welded or Expanded Connections . . . . . .





Overall dimensions for installation of Cast Iron GRID Unit Heater

THE GRID UNIT HAS THESE ADVANTAGES

- Low maintenance expense.
- More air changes per hour.
- Lower outlet temperature.
- Larger air volume.
- No electrolysis to cause corrosion-leaks or breakdowns.
- One-piece construction—no soldered, brazed or expanded connections.
- Positive "directed" heat.
- Open design that keeps units clean.

CI (CAST IRON) SERIES GRID UNIT HEATER DATA

Model No.	Dimensions A	B	C	D	E	Motor HP	RPM	Vol. Fan CFM	Capacities 5 PSI Steam 60°F Air Btu/Hr.	Final Temp. °F	Pipe Size Supply	Return	Support Rod Dia.	Approx. Ship. Weight Lbs.
CI-1000	11⅝	10½	12¼	10 7/16	17¼	1/25	1550	572	29,080	106	1¼	1¼	½	150
CI-1200	14⅛	13⅛	12¼	13 1/16	21½	1/12	1550	798	45,450	112	1¼	1¼	½	210
CI-1500	17½	15⅝	11½	16	23⅞	⅛	1750	1500	76,500	107	1½	1½	½	280
CI-1520	17½	15⅝	11½	21	28⅜	⅛	1750	1700	101,500	114	1½	1½	½	390
CI-2000	22⅛	20 9/16	11⅞	21 1/16	28⅛	1/6	1150	2600	143,000	110	2	1½	½	490
CI-2025	22⅛	20 11/16	11⅞	25⅞	35¼	1/6	1150	2875	173,640	115	2	1½	½	520
CI-2500	27½	25⅞	13	25⅞	35¼	½	1150	4350	224,000	107	2	1½	⅝	700
CI-2504	27½	25⅞	13	25⅞	35¼	¼	1150	3300	206,000	117	2	1½	⅝	660
CI-2530	27½	25⅞	13	31	40½	½	1150	4650	275,800	114	2	1½	⅝	900
CI-3000	32⅝	31	13	31	40½	½	850	6300	332,000	108	2½	1½	⅝	1020
CI-3000	32⅝	31	13	31	40½	1½	1150	8000	380,000	103	2½	1½	⅝	1070

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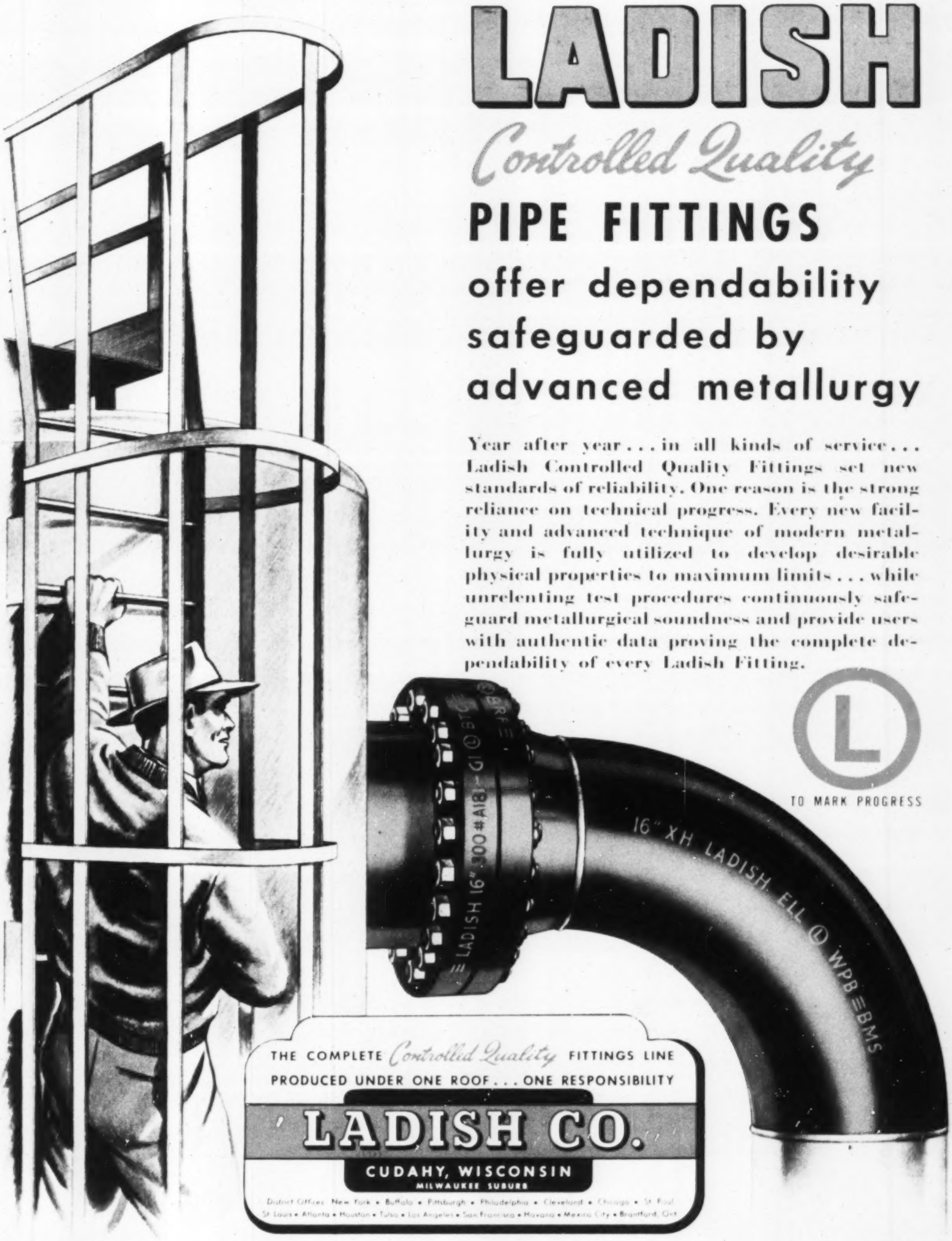
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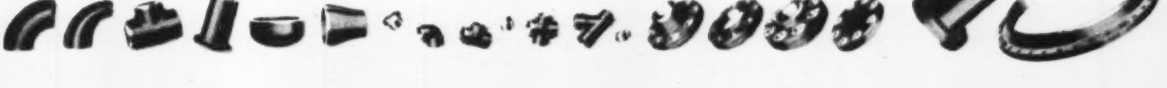

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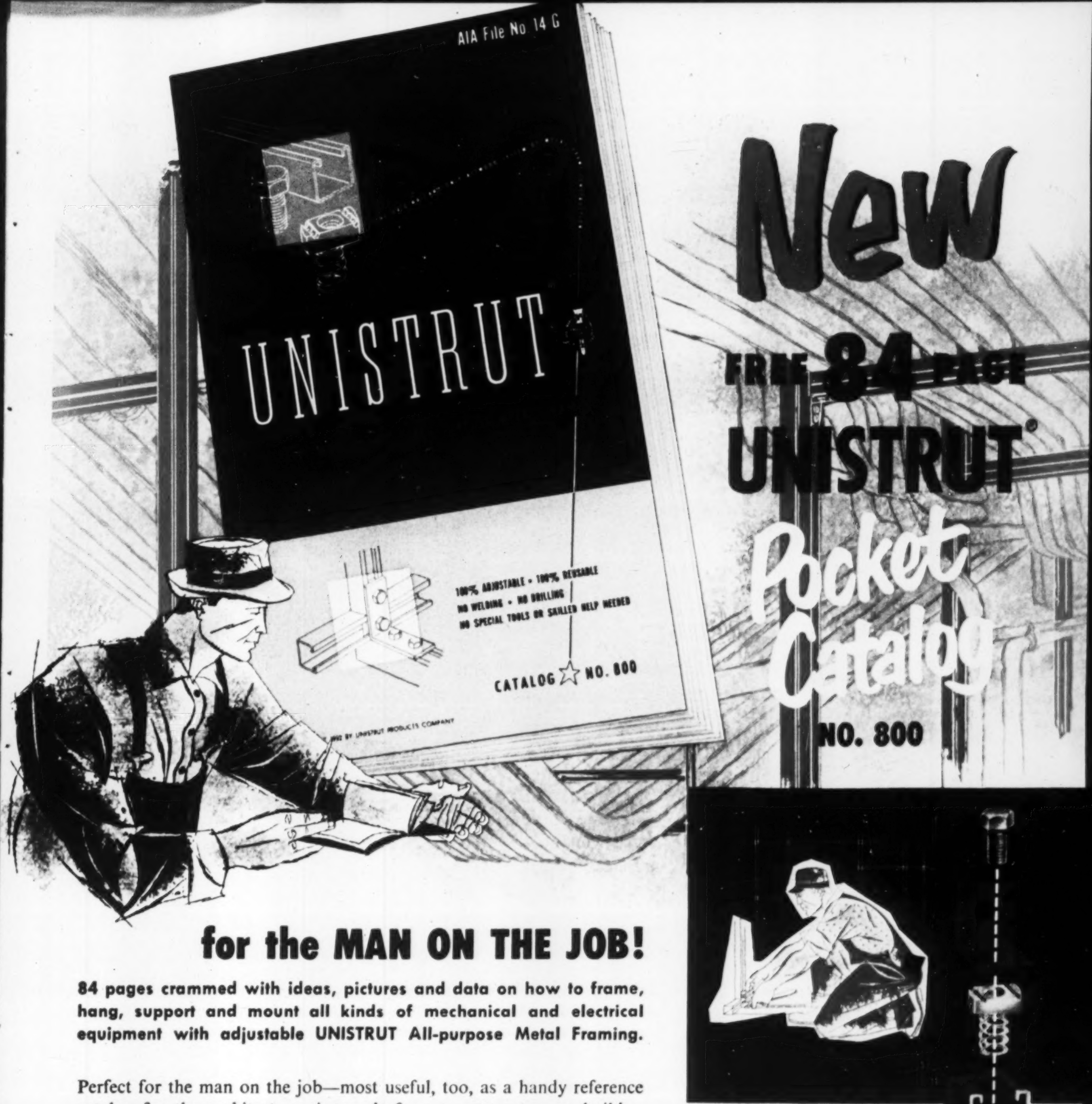
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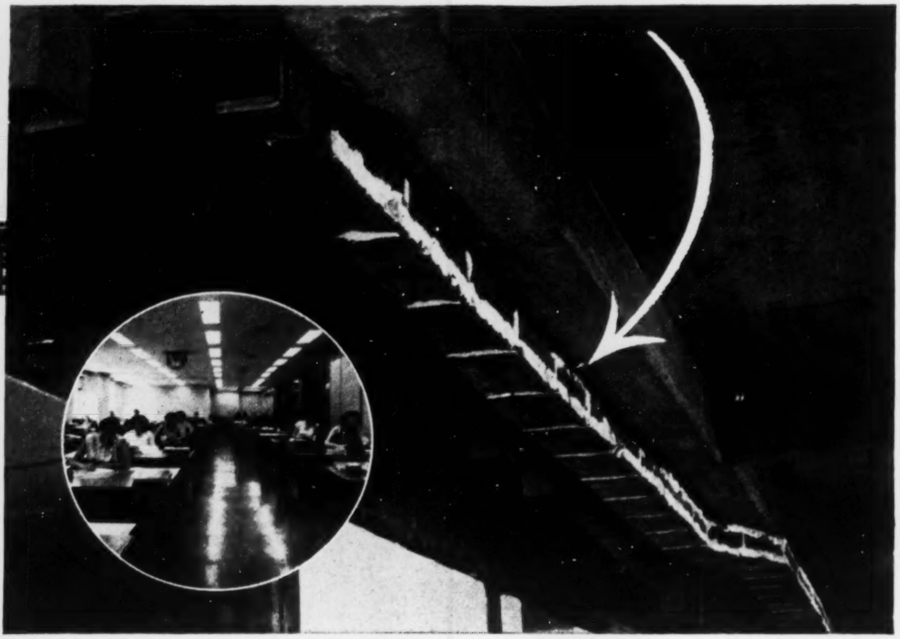
Right: Spintex insulation on the air-conditioning ducts serving offices in the Chrysler Building East. Applied by the Asbestos Construction Company, Inc. of New York, an outstanding J-M Insulation Contractor.

On air-conditioning ducts serving 420,000 sq ft of office space . . .



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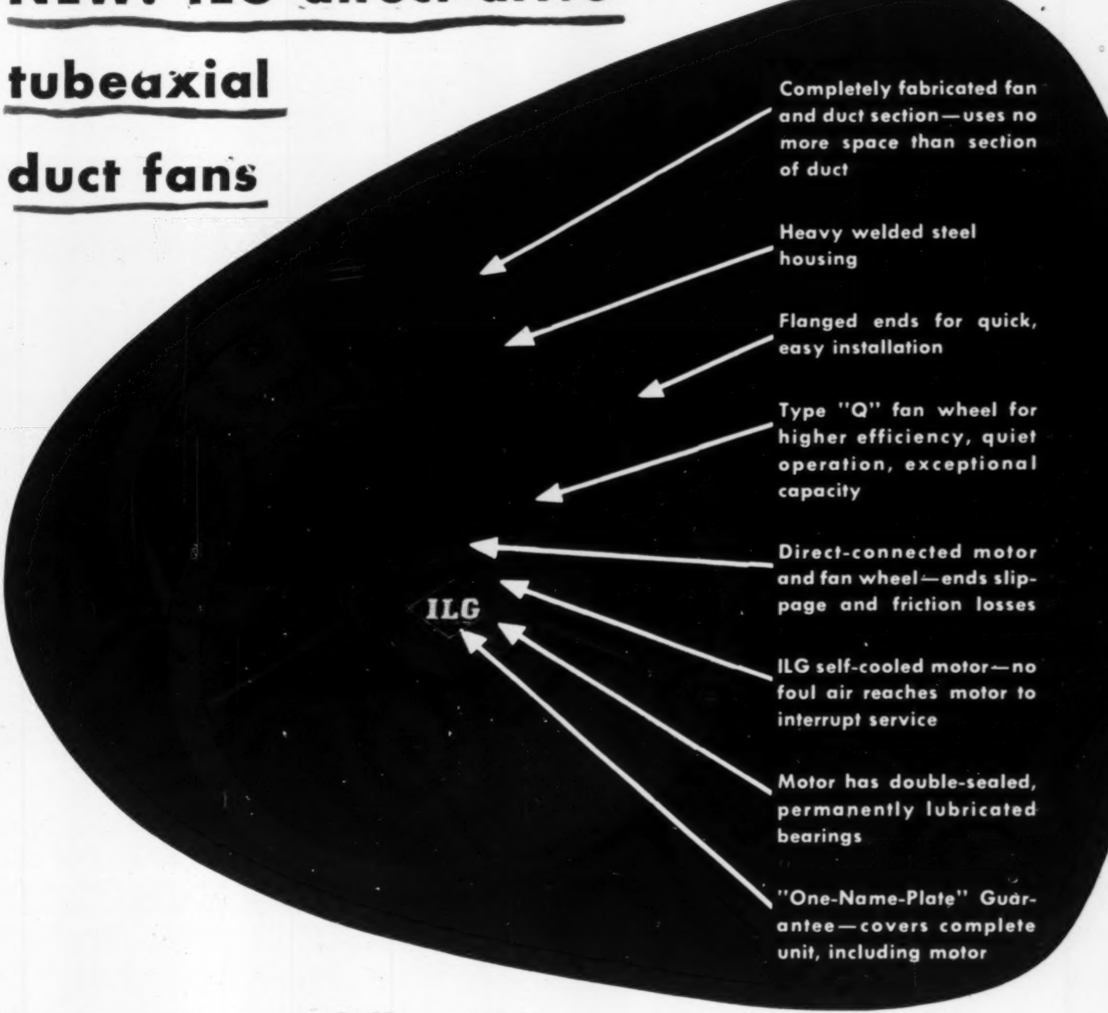

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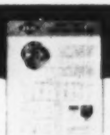

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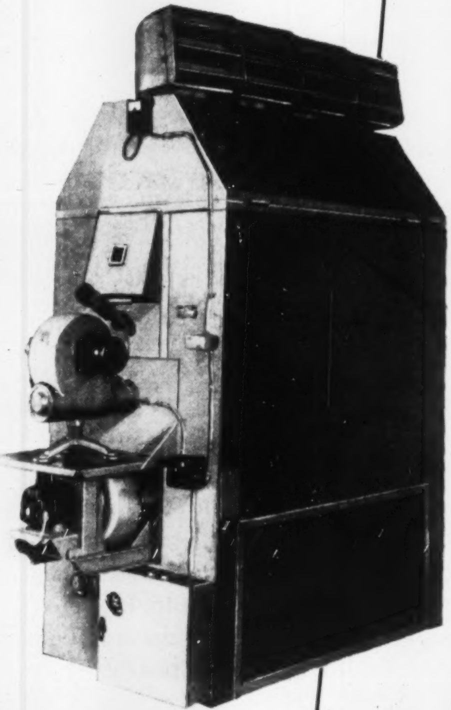

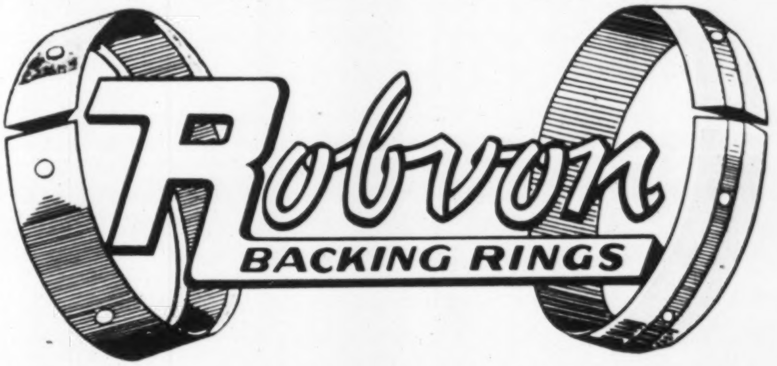

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ROBVON IS THE ONLY MANUFACTURER OF THE "C-NUB" TYPE BACKING RING

"C-NUB" and TAPERED in SPLIT or FABRICATED (heliarc) SOLID

Carbon (.08)
1% ChrMo (A-315)
4-6% ChrMo (Type 501)
3S-H14 Aluminum
18-8 Stainless (Type 347Cb)
Inconel X, Monel, Incoloy, Alloy Stainless and other metals.

An economic saving in materials, the ROBVON "C-NUB" BACKING RING *SAVES* more than 50% fit-up preparation — *REDUCES* initial maintenance and replacement costs.

ROBVON "C-NUB" BACKING RINGS are CATALOGUED — STOCKED — SOLD by leading Pipe, Valve and Fitting Manufacturers and through their branches, distributors and jobbers. "STANDARDIZED" by TOP-SIDE Fabricators, Designers, Consultants, Utilities, Shipbuilders, Refiners, Industrials, Chemicals, Textiles, Boiler and Turbine Manufacturers and other diversified Users.

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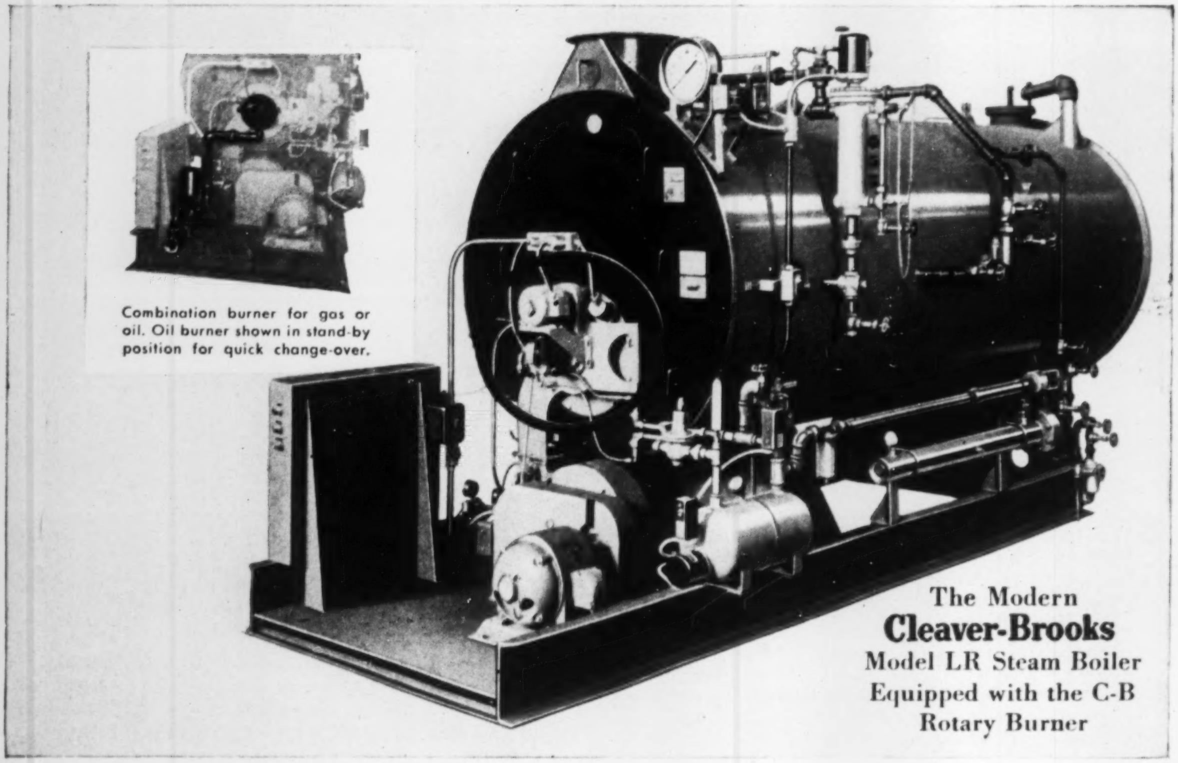
unmatched **Flexibility** of operation ...and of quick fuel change-over



Combination burner for gas or oil. Oil burner shown in stand-by position for quick change-over.

The Modern
Cleaver-Brooks
Model LR Steam Boiler
Equipped with the C-B
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✓ **Quick Steaming—Fast, effortless response to fluctuating steam demands**

✓ **Equally high efficiency using heavy No. 6 oils (or lighter oils) and all types of industrial gas**

IF the quantity of steam required in your plant fluctuates throughout the day, depending upon the amount of steam-using equipment in operation, you can cut your steam costs substantially with a Cleaver-Brooks Boiler. It operates at a full 80% guaranteed efficiency whether you require maximum load use of all steam-using equipment. . .or whether your equipment is not in use, requiring as little as 30% response—often just enough to heat the plant.

Install a Cleaver-Brooks Boiler — oil, gas, or combination — either fuel properly proportioned by the exclusive Cleaver-Brooks Burner to meet your fluctuating or constant steam demand. Fully automatic, clean, with a single source for all of its matched parts . . . you benefit with lower fuel bills, less maintenance, reduced operating costs, greater profits. Why not consider changing your present boiler plant and think of flexibility — remember Cleaver-Brooks and get the complete facts on boilers, 15 to 500 HP — 15 to 250 lbs. psi.

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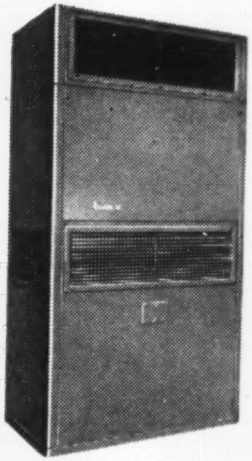
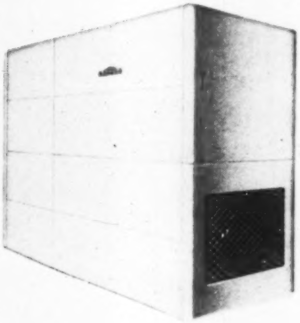
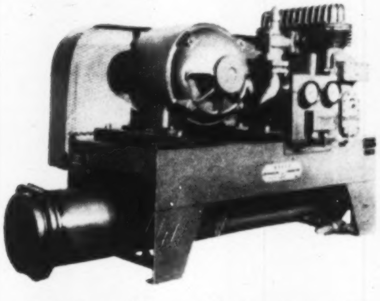


Bakeraire — completely self-contained unit in 3, 5, 7½ and 10-ton capacities for single or multiple installation with or without ducts. Compact, extremely quiet, easily installed for summer and winter air conditioning.



Central-Air — complete air conditioning system with built-in evaporative condenser in capacities from 5 to 40 tons. Unit construction simplifies installation inside or outside building. Zone control permits flexibility of application.



Refrigeration Equipment—a full line of Baker Ammonia and Freon compressors, air handling equipment, valves and fittings meet exact specifications for every type of air conditioning and refrigeration installation.

Solved!

...precision industries' "tolerance" problems ...with BAKER air conditioning

Control OF THE AIR IS VITAL IN THESE CRITICAL AREAS ✓

- Gauge rooms
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- Photographic darkrooms
- Biological laboratories
- Finishing rooms
- Tool and die rooms
- Dispensaries
- Precision machinery
- Research laboratories

Extremely close tolerances are common in today's precision industries . . . tolerances that are demanded in building the complex machinery of our defense effort. To successfully maintain these tolerances, the temperature, humidity and cleanliness of the air must be closely controlled.

It is here that Baker air conditioning equipment has proved essential. From the smaller 3 to 10 ton Bakeraire units, the 5 to 40 ton Central Air units, through the largest engineered installations running into hundreds of tons, Baker refrigeration equipment has met the most severe operating requirements.

Today, as for more than 45 years, Baker is ready to provide American industry with the equipment and the engineering know-how needed to achieve "control of the air" . . . wherever it may be called for.

Baker Refrigeration Corporation
South Windham, Maine
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"Intentionally better since 1905"

Baker

AIR CONDITIONING
and REFRIGERATION

HUMIDITY TROUBLE?

Yarn Lab keeps it within ±1%

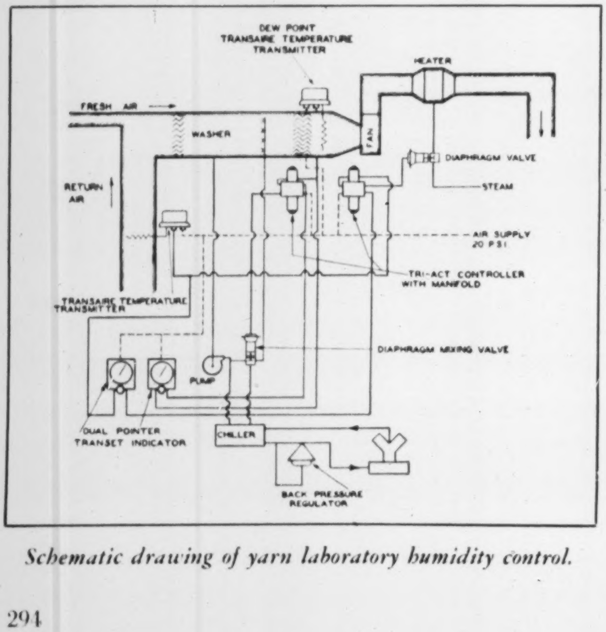
"TEMPERATURE and HUMIDITY just stay the same all the time", reports a member of the yarn laboratory staff of a large, modern Textile Mill in the South. The air conditioning system was designed by The Bahnson Company and is completely Taylor controlled—to within ±1% relative humidity. All of the components of the three-part TRANSET* Control System are shown opposite.

The dew point TRANSAIRE* Transmitter (shown in large picture) transmits to one of the TRI-ACT* Controllers (top picture) which regulates the three-way water valve. The mixing valve in the circulating line shunts water through, or by-passes the cooler, according to the demands of the Controller. As the dew point rises, so does the RH, thus more water goes through the cooler, and vice-versa.

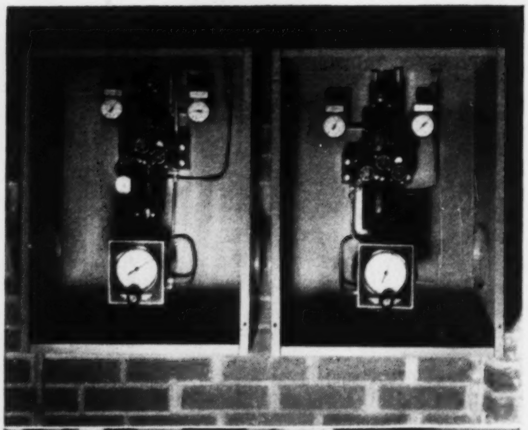
The dry bulb TRANSAIRE Transmitter transmits to the other TRI-ACT Controller which regulates the reheat steam valve to keep the room at an even temperature. Its main function is to keep it from getting too cool since, when there is no load in the room, the dew point cold water slowly lowers the temperature. Constantly changing loads necessitate an extremely sensitive controller for this function, and our engineer reports that "it's doing a beautiful job, the customer's satisfaction is complete".

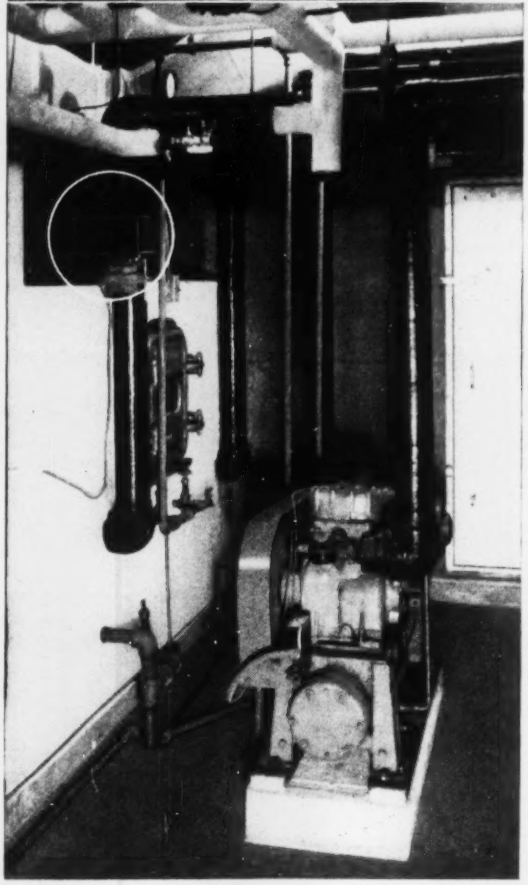
If close humidity and temperature control are important to you, why not call in your Taylor Field Engineer, or write for full information to Taylor Instrument Companies, Rochester, N. Y., and Toronto, Canada.

*Trade Mark


DEW POINT TRANSAIRE TEMPERATURE TRANSMITTER
HEATER
FRESH AIR
WASHER
FAN
DIAPHRAGM VALVE
RETURN AIR
STEAM
AIR SUPPLY 20 PSI
TRI-ACT CONTROLLER WITH MANIFOLD
TRANSAIRE TEMPERATURE TRANSMITTER
DIAPHRAGM MIXING VALVE
PUMP
DUAL POINTER TRANSET INDICATOR
CHILLER
BACK PRESSURE REGULATOR

Schematic drawing of yarn laboratory humidity control.





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IN HOME AND INDUSTRY

Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity.

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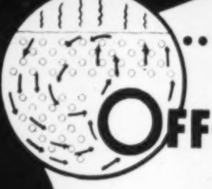

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Induces positive, fast water circulation in a rotary motion, resulting in uniform water temperature in shell . . . faster steaming . . . elimination of surging and priming . . . a steady water line at all times . . . higher quality, dry steam . . . and a higher column of water above the furnace. Every point makes sense — makes performance too!

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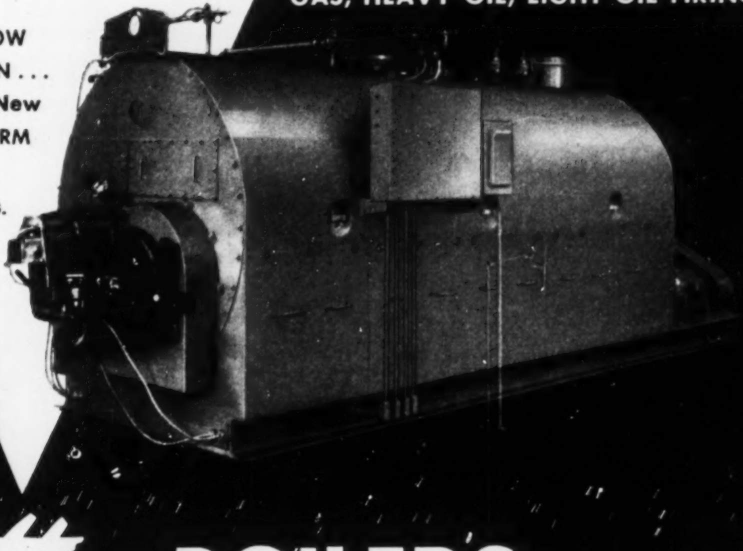

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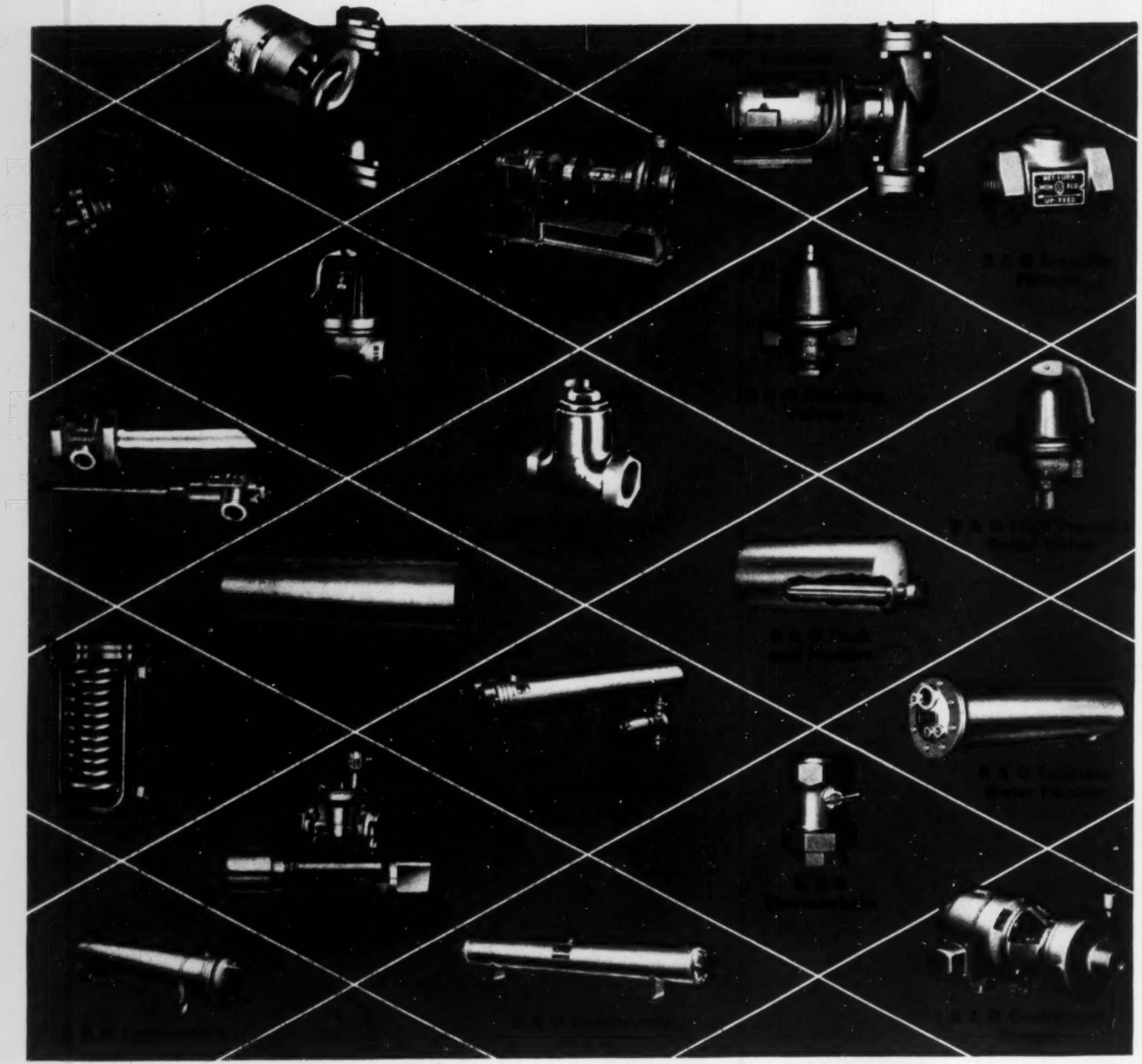
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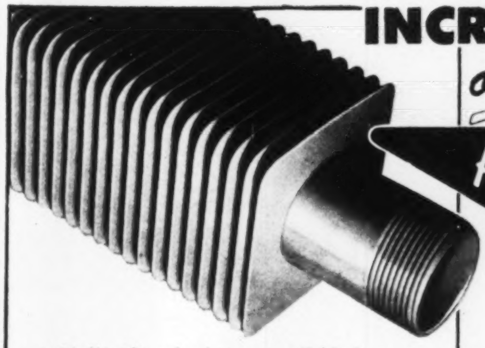


INCREASE YOUR PROFITS

on any installation with

Rittling

FINNED TUBE EQUIPMENT

● Rittling, pioneers in smart styling, combines clever designing that appeals to architects, engineers and contractors, home-builders and modernizers alike! As efficient as they are good looking, Rittling finned tube applications are strong and rigid, easy to calculate, easy to install. There's a Rittling product, model and size tailored to *every* heating requirement, commercial or industrial — all first with the last word in design.

● Rittling finned tubes are available in seamless high pressure steel tubing with heavy gage steel fins or seamless copper tubing with heavy gage aluminum fins. Fins are tightly bonded by a special Rittling tube expansion process. For systems operating up to 200 psi working pressure. In one foot increments from 2 to 12 feet.

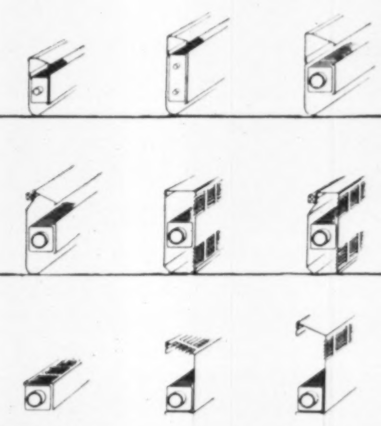
ENCLOSURE
WALL
FINNED TUBE

SIL-TYPE RADIATION

● Developed FIRST by Rittling! Meets heating problems created by large, continuous window areas. The radiation cover becomes the window sill *and* the visible wall surface, eliminating need for window stool and plastering. The finned tube element extends the entire length of the exposed wall and permits piping in series with dampers to provide individual room control. A combination of beauty, comfort and economic construction!

BTU RATINGS

TUBE TYPE		A=21"			A=27"			A=33"		
		C125 S125	S200	S4125	C125 S125	S200	S4125	C125 S125	S200	S4125
Average Water Temp. Air at 65° F.	180°	786	971	1093	807	996	1111	820	1013	1140
	200°	1009	1246	1403	1035	1279	1439	1053	1300	1463
	210°	1114	1377	1550	1144	1413	1589	1163	1437	1616
1 PSI Steam Air at 65° F.		1173	1449	1631	1204	1487	1673	1224	1512	1701



BASEBOARD OR WALL HUNG RADIATION

● Rittling elements may be installed in one, two or three tiers in a wide range of enclosures with flat or sloping top, with or without grilles . . . all ruggedly built, and specially designed for attractiveness.

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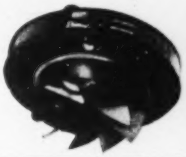
Wall hung or free standing models fully or partially recessed — for residential, commercial or industrial installations.

UNIT HEATERS

Horizontal or vertical models for steam or hot water. Rugged, yet neat appearing. With adjustable louvres.



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THE RITTLING CORPORATION · RAND BUILDING BUFFALO 3, NEW YORK

Please send literature as checked:

☐ Sil-Type Radiation
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"PIONEERS IN FINNED-TUBE ADAPTATIONS"

VISIT US IN BOOTH 446—A.S.H.&V.E. SHOW

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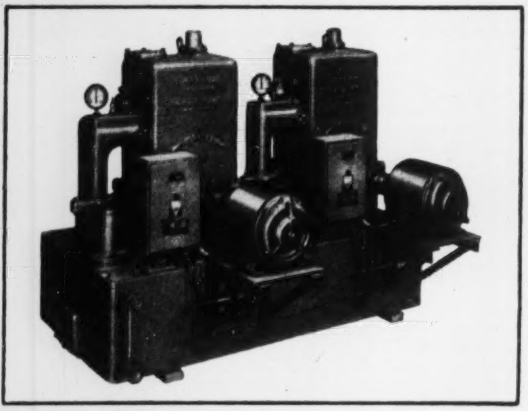
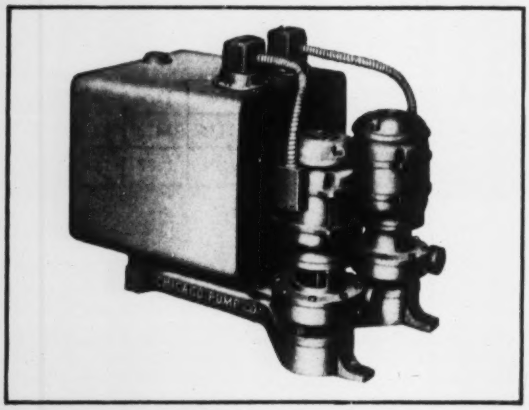
ARE BETTER PUMPS FOR EVERY BUILDING SERVICE



DUPLEX CONDO-VAC RETURN LINE VACUUM AND BOILER FEED PUMP

Specifically designed for vacuum heating systems. The water capacity of the Condo-Vac remains constant up to the boiling point. The air capacity remains constant to the evaporation point. Pressures up to 40 lbs. Capacities from 2500 to 150,000 EDR. Described in Bulletin 270.



SURE RETURN CONDENSATION PUMP & RECEIVER

For systems up to 75,000 EDR and for low and medium pressures. Available in either single or duplex units. The base serves as a large capacity manifold through which the condensate flows by gravity from the receiver to the pump. The Sure Return will not steam bind. Described in Bulletin 250.

CHICAGO PUMP COMPANY

BUILDING and INDUSTRIAL DIVISION

622 DIVERSEY PARKWAY **CHICAGO 14, ILLINOIS**

Condo-Vac, Sure Return, AVC, LVC,
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Flush-Kleen Sewage Ejectors
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Pumps for every industrial use.

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For every heating system get the pump that is specifically designed for the particular job. For below floor returns, for low vacuum systems, for small capacity high pressure requirements, for any standard heating system, or any unusual condition, there is a CHICAGO Heating Pump that will do the job better. All ratings and receiver capacities meet or exceed ASHVE standards.

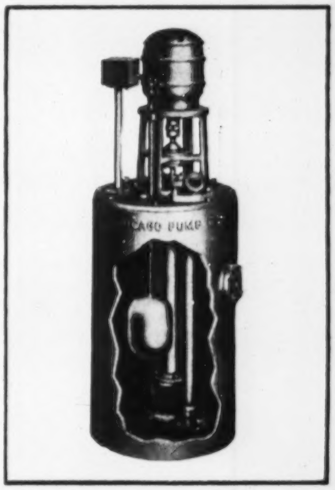
TYPE AVC CONDENSATION PUMP & RECEIVER

Heavy cast iron receiver with low inlet for floor mounting or shallow pit. Sets on floor—no foundation bolts necessary. Weight of unit and piping hold unit firmly in place. For 500 to 10,000 EDR and 10 to 30 lbs. pressure. See Bulletin 245.

CHICAGO PUMP CO

TYPE CLL1 VERTICAL CONDENSATION PUMP & RECEIVER

Specifically designed for low return service and underground installations. Flanges are accurately finished and gasketed to prevent steam leaks. Pump and receiver are shipped as a unit, ready to install. For 1000 to 40,000 EDR and 10 to 25 lbs. pressure. Described in Bulletin 255.



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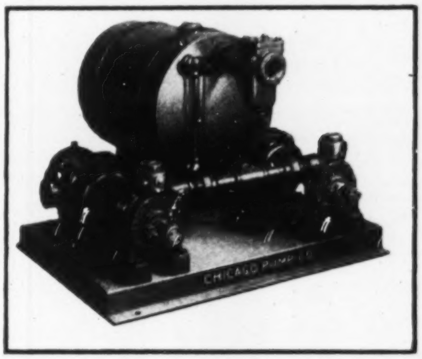
International Amphitheatre, Chicago
January 26-30, 1953

DUPLEX FC CONDENSATION UNIT

Single or duplex units are specifically designed for operating conditions where pressures are high and capacities relatively small. For duty up to 50,000 EDR and discharge pressures up to 150 lbs. Described in Bulletin 260.



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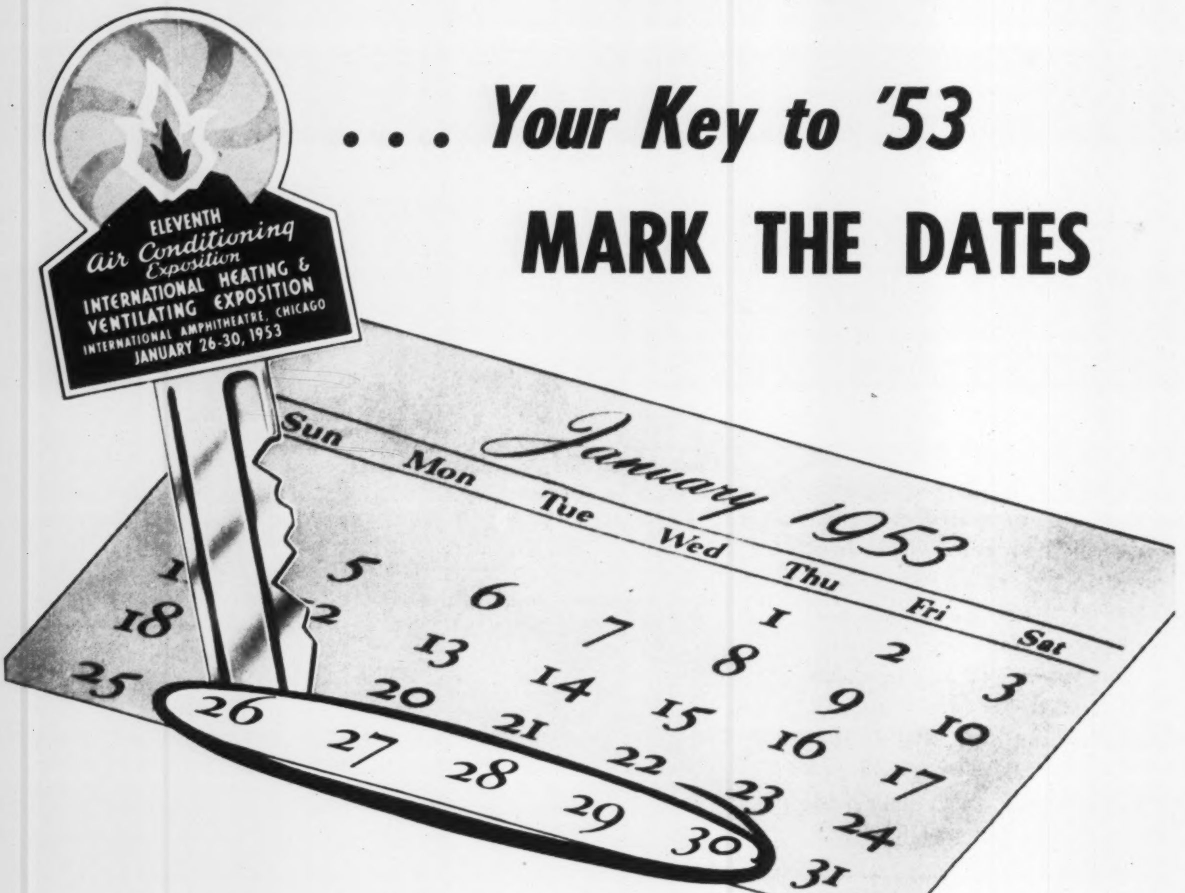
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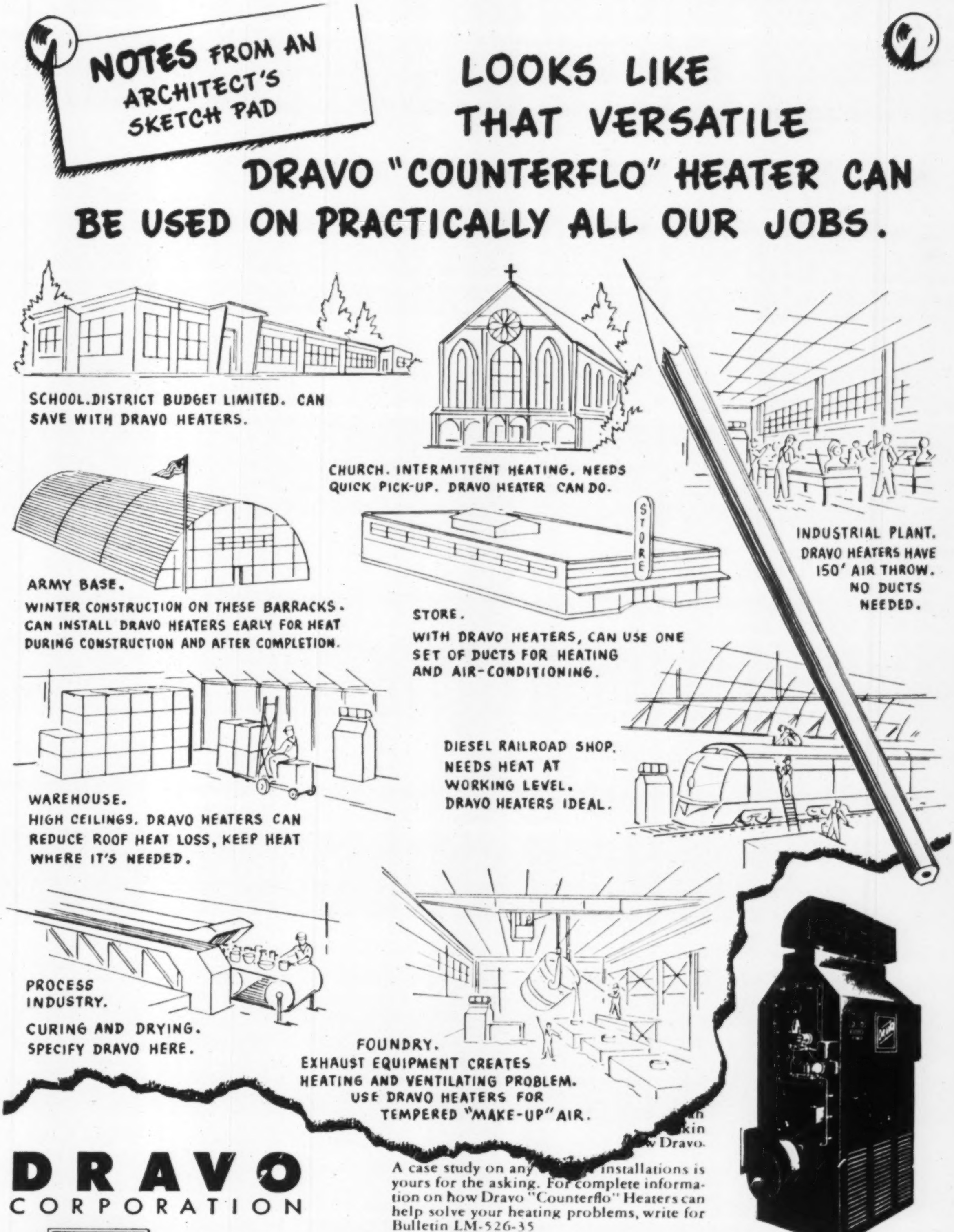
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ARMY BASE. WINTER CONSTRUCTION ON THESE BARRACKS. CAN INSTALL DRAVO HEATERS EARLY FOR HEAT DURING CONSTRUCTION AND AFTER COMPLETION.

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FOUNDRY. EXHAUST EQUIPMENT CREATES HEATING AND VENTILATING PROBLEM. USE DRAVO HEATERS FOR TEMPERED "MAKE-UP" AIR.

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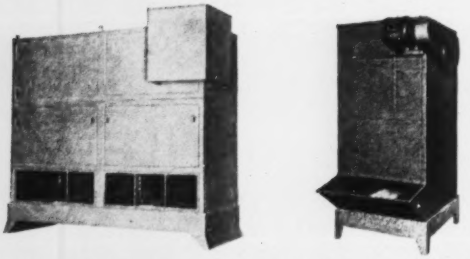

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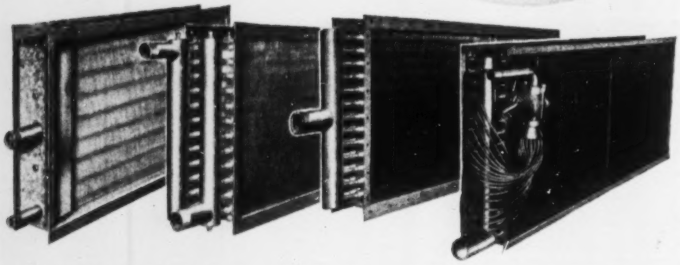
Architects, Consulting Engineers and Contractors have long known the quality performance of Kennard Heat Transfer Products. Now, more than ever, Kennard is being specified because of the many features frequently found only in Kennard products.

Specify Kennard on your next job.



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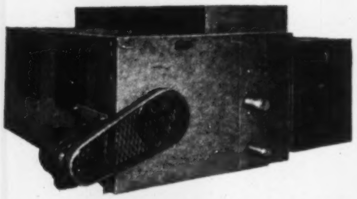

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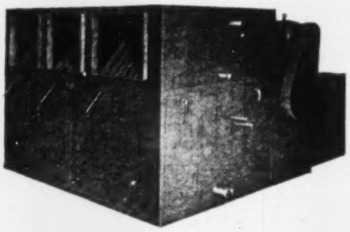

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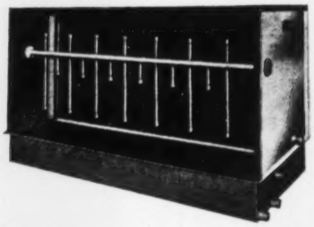

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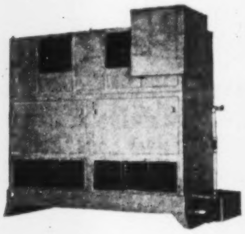
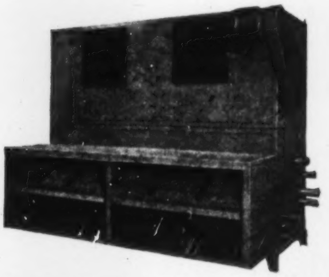


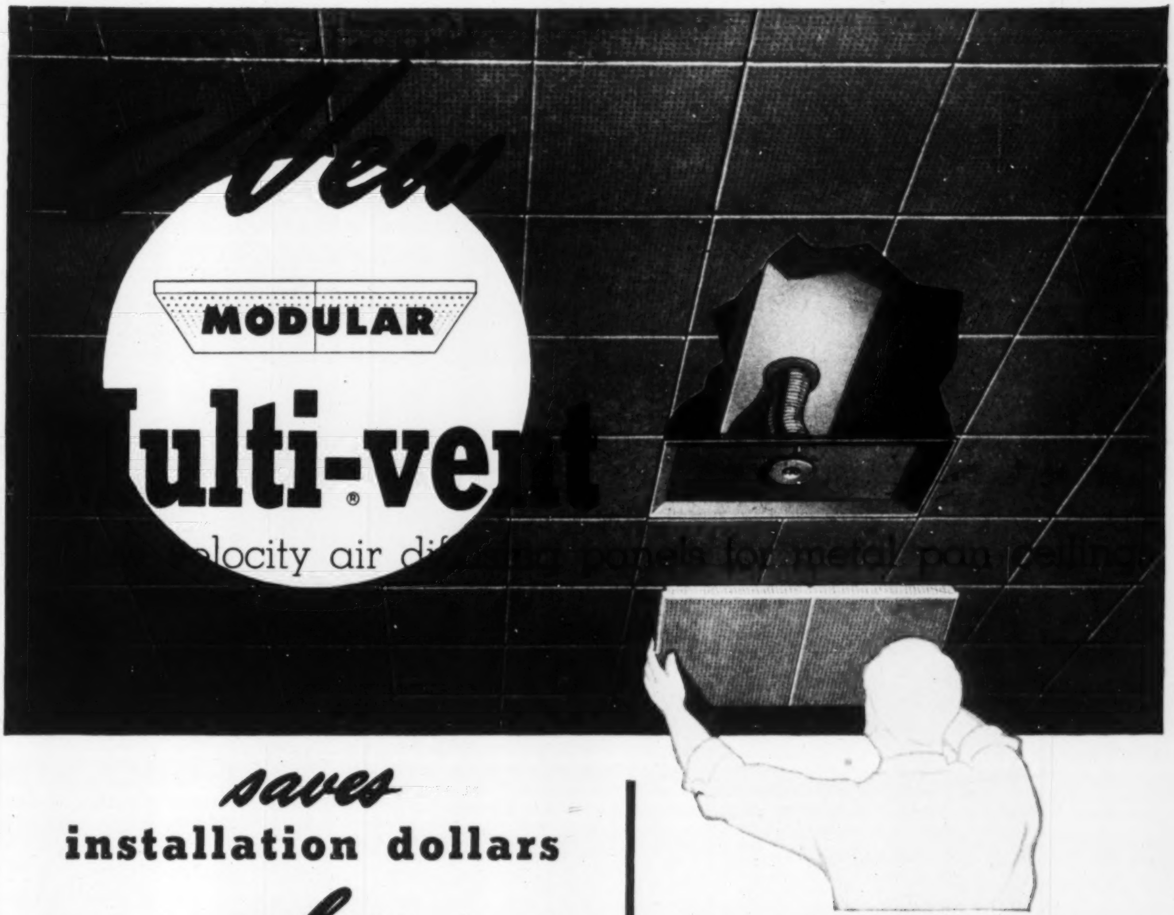
EVAPORATIVE CONDENSERS—Indoor-Outdoor. 7½ to 75 Tons. Catalog No. 491.



AIR CONDITIONING BLOWER UNITS—13 Sizes. 300 to 21,600 CFM. Horizontal or Vertical. Catalog No. 486.

Write for name of nearest representative and catalogs needed.

KENNARD CORPORATION • 1817 S. HANLEY ROAD
ST. LOUIS 17, MO., U.S.A.


New
MODULAR
ulti-vent®
locity air di panels for metal pan ceiling

saves
installation dollars

solves
every important air distribution problem

for the *OWNER • ARCHITECT*
ENGINEER • CONTRACTOR

- Complete concealment.
- Panel locations determined solely by load considerations.
- Relocation of partitions requires no panel alterations.
- Exceptional uniformity and control of room temperature.
- The highest loads and ventilating requirements handled with a total absence of strong air streams.
- System design, installation, and balancing extremely simple and rapid.

Material and labor saving installation features

1—Shop built duct work installed and system balancing completed prior to and independent of ceiling erection.

2—No additional material, structural work, turndown collars or rigid connections requiring close fitting, sealing or calking are involved.

3—All components of Modular Multi-Vent panels are quickly and easily assembled, attached and aligned in the ceiling by hand without the use of tools. No cutting or reshaping of standard ceiling materials is necessary.

4—Existing air distribution systems can be readily and economically converted to Modular Multi-Vent.

Write for bulletin 385 with complete details and specification data.

MULTI-VENT DIVISION

THE PYLE-NATIONAL COMPANY
1373 North Kostner Ave., Chicago 51, Ill.

Specify GLOBE for the finest steel tubes

Globe's Physical Testing Laboratory — one of the seven different research and testing labs in Globe's House of Science.

Specialized research, engineering and production assure uniform high-quality STEEL TUBES

AT Globe, specialization is the keynote. Men, machines, and raw materials are all tailored to fit the Globe *specialized* process. Precision checks — and rechecks — at every stage of production insure Globe Tubes that meet *your* exacting specifications.

Be sure! Specify dependable, high-quality Globe Steel Tubes and be certain of getting the finest tubes available. Write for the General Catalog and become acquainted with Globe *specialized* process.

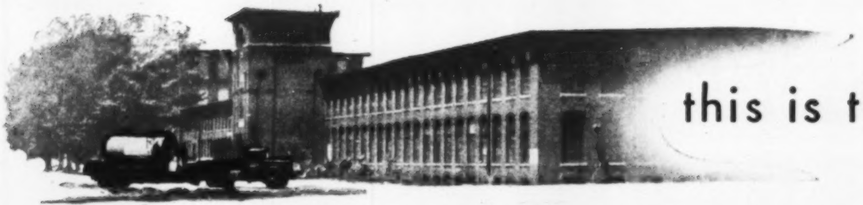
GLOBE STEEL TUBES CO., Milwaukee 46, Wisconsin

Chicago • Cleveland • Detroit • New York • Houston • St. Louis
Denver • San Francisco • Glendale, Cal. • Philadelphia

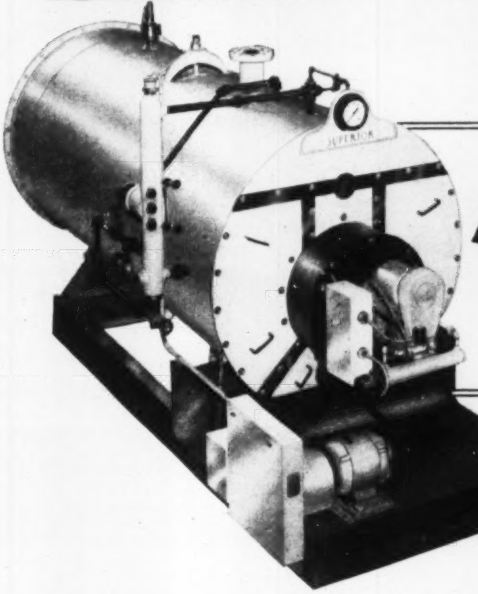
GLOBE TUBES

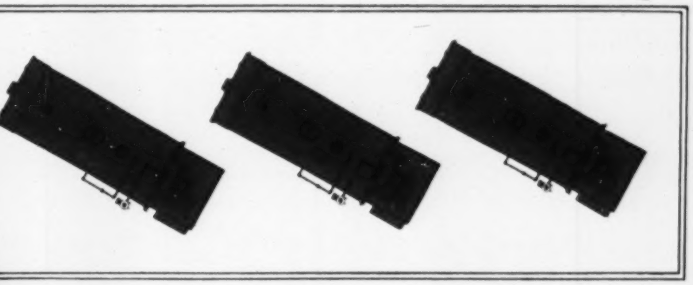
GLOBE STEEL TUBES ARE AVAILABLE IN:

• Stainless Steels — Globe seamless • High Purity Iron — Globeiron • Stainless Steels Gloweld Welded • Corrosion Resistant Steels • Alloy Steels • Carbon Steel • High-Temperature Service Steels • Standard and Special Analysis Steels • Mechanical and Pressure Tubing



this is the plant . . .





Unusually compact arrangement allowed for the installation of all three units in a boiler room only 20′ x 60′

. . . . where 3 SUPERIOR STEAM GENERATORS saved more than their cost in less than 2 years

Only four years ago, this plant was inadequately heated with coal at a fuel cost (excluding labor) of approximately $44,000. per year. Three years ago, three Superior Steam Generators were installed with the following three results:

(1) Fuel costs were cut to $22,000 . . . and in less than two years, those Superior Steam Generators saved their total cost.

(2) The ability of those Superior Steam Generators to deliver their full rated capacities provided steam in excess of that required for heating . . . which was sold as process steam to further reduce the cost of operation.

(3) Because of their compact design, a substantial saving in space resulted; and the space thus saved was profitably rented to still further reduce the cost of operation.

To meet increased demands for process steam, a fourth Superior Steam Generator has recently been installed.

This is but one of the many case studies which demonstrate the advisability of investigating the installation of Superior Steam Generators in your plant. For complete details write for Catalog 504.

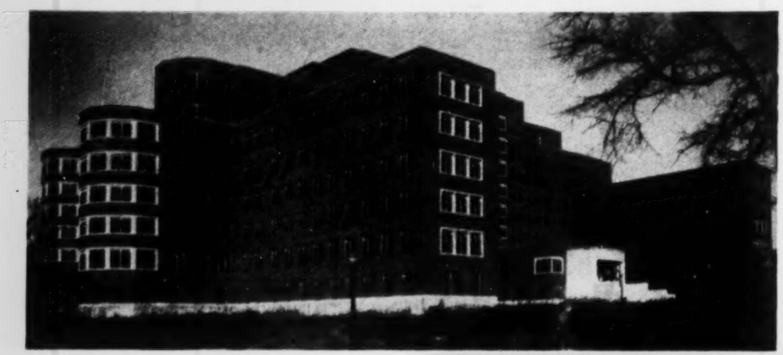
Superior Steam Generators are fully automatic; burn oil, gas, or both. 18 sizes from 20 to 600 b.h.p. for pressures up to 250 p.s.i. or for hot water.

for performance you can **BANK** *on*

SUPERIOR **STEAM GENERATORS**

SUPERIOR COMBUSTION INDUSTRIES INC.
TIMES TOWER, TIMES SQUARE, NEW YORK 36, N.Y.

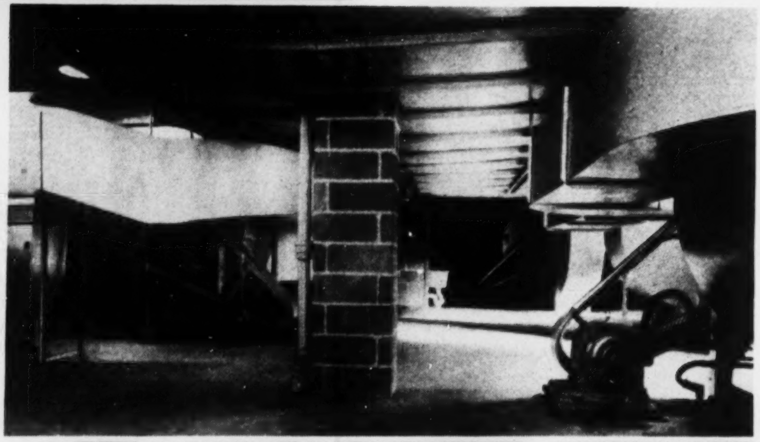
ENGINEERED for Quiet Operation



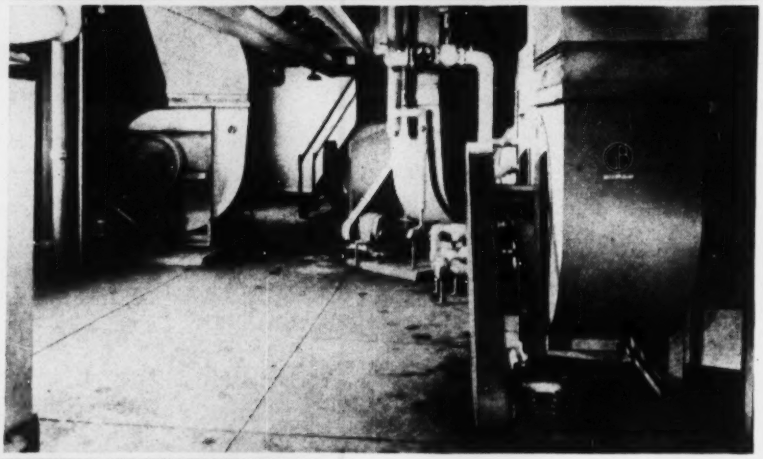
GENERAL BLOWER has developed a rugged line of blowers with minimum impeller noise. Quiet operation is essential in hospitals and institutions. These blowers have been time-tested, and operate efficiently under the most severe conditions. Aside from the installations shown, GENERAL BLOWERS were recently installed in East Harlem and Cumberland Hospitals, in New York City, and in Utica State Hospital, Utica, New York.

Hudson River State Hospital and equipment room, Dept. of Public Works.

Whitney-Dierks Heating Corp., Heating and Ventilating Contractors.



HOSPITAL
QUIET

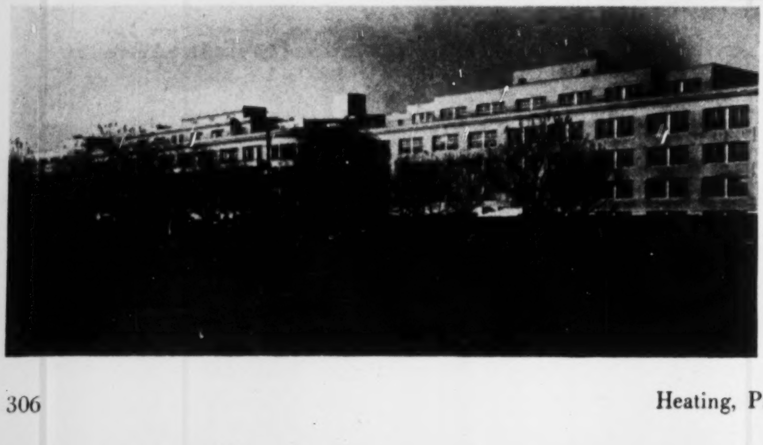


Meadowbrook Hospital and equipment room.

Eggers & Higgins, Architects and Engineers.

Guy Panero, Consulting Engineer.

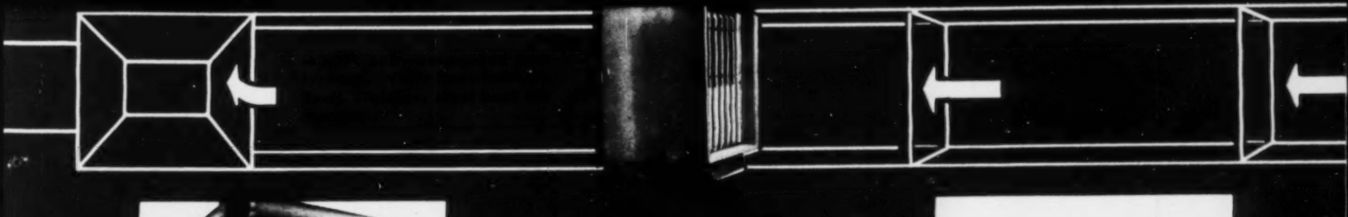
Arthur E. Magher Corp., Heating and Ventilating Contractors.

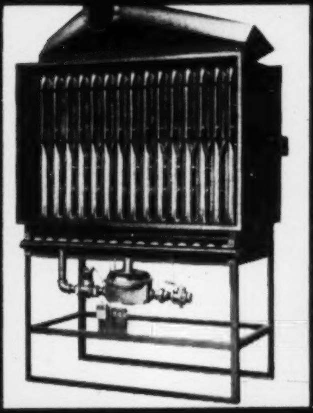


GENERAL BLOWER COMPANY

MORTON GROVE, ILL.

Twenty-five years' background in the fan and blower industry. Engineering offices in major cities.





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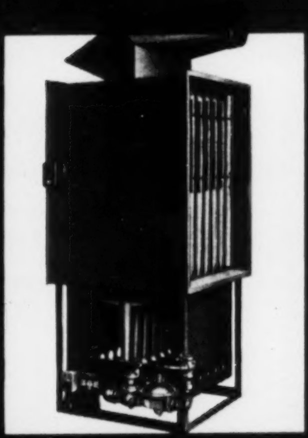

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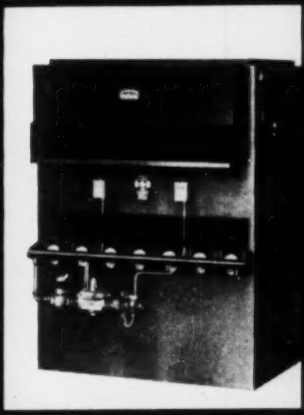

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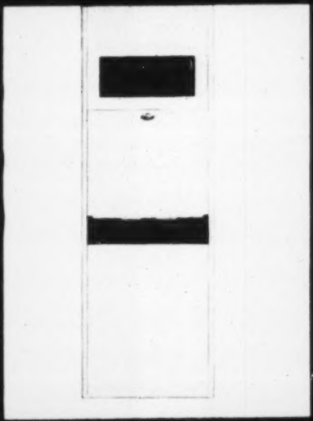

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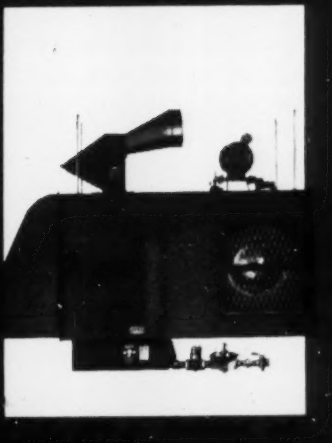

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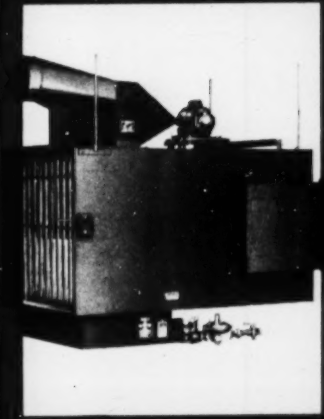

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HAYES
FURNACES

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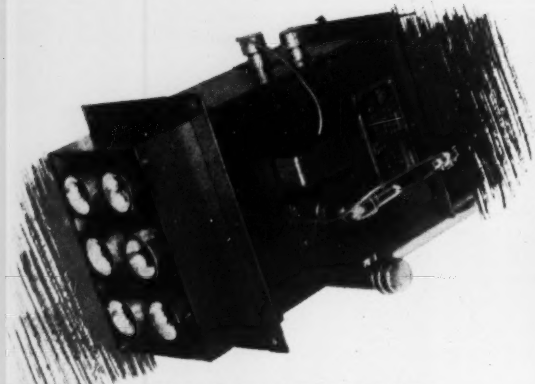
HAYES
GAS FURNACES

JZ JOHN ZINK

BURNERS *for All* HEATING *and* POWER NEEDS

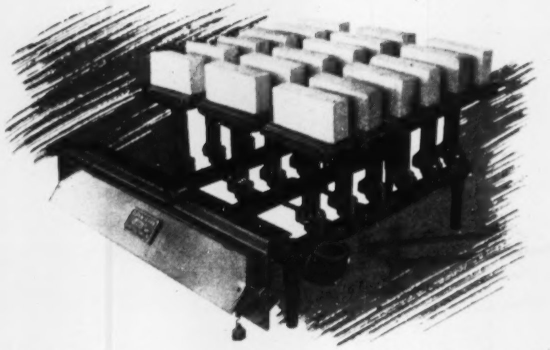


SERIES STV GAS BURNER

4" to 2#

Ideal for heating boiler installations. From one head to fifty heads. Quiet, efficient and economical operation.

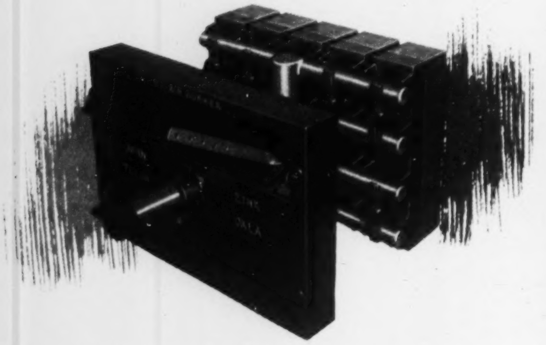
Write for literature.



SERIES VR VERTICAL GAS BURNER

4" to 4 oz.

This burner is one of the "upshots" or vertical radiant type with multiple burner heads so designed as to entrain a certain amount of primary air from the total air entering through the louvre. The "VR" burners are especially designed to operate in boilers having low draft and small combustion space.



SERIES "R" BI-AIR BURNER

4" to 1#

For all types and sizes HEATING BOILERS and small Power Boilers — JOHN ZINK offers the Series "R" Bi-Air short flame, Gas Burner with Multi-Jet burners, having refractory semi-venturi mixing throats, with a separate gas orifice to each throat. Capacities to meet your requirements.

Especially adapted for installing in boilers having very low draft and small combustion space.

SUSPENDED UNIT HEATER

The John Zink UHS Gas-fired fan type suspended heater is a complete, packaged unit and fully automatic. A. G. A. approved for natural, mixed, manufactured or LP Gas.

New JZ Units for '53

Dual Cooling and Heating Unit for all weather conditioning.

•

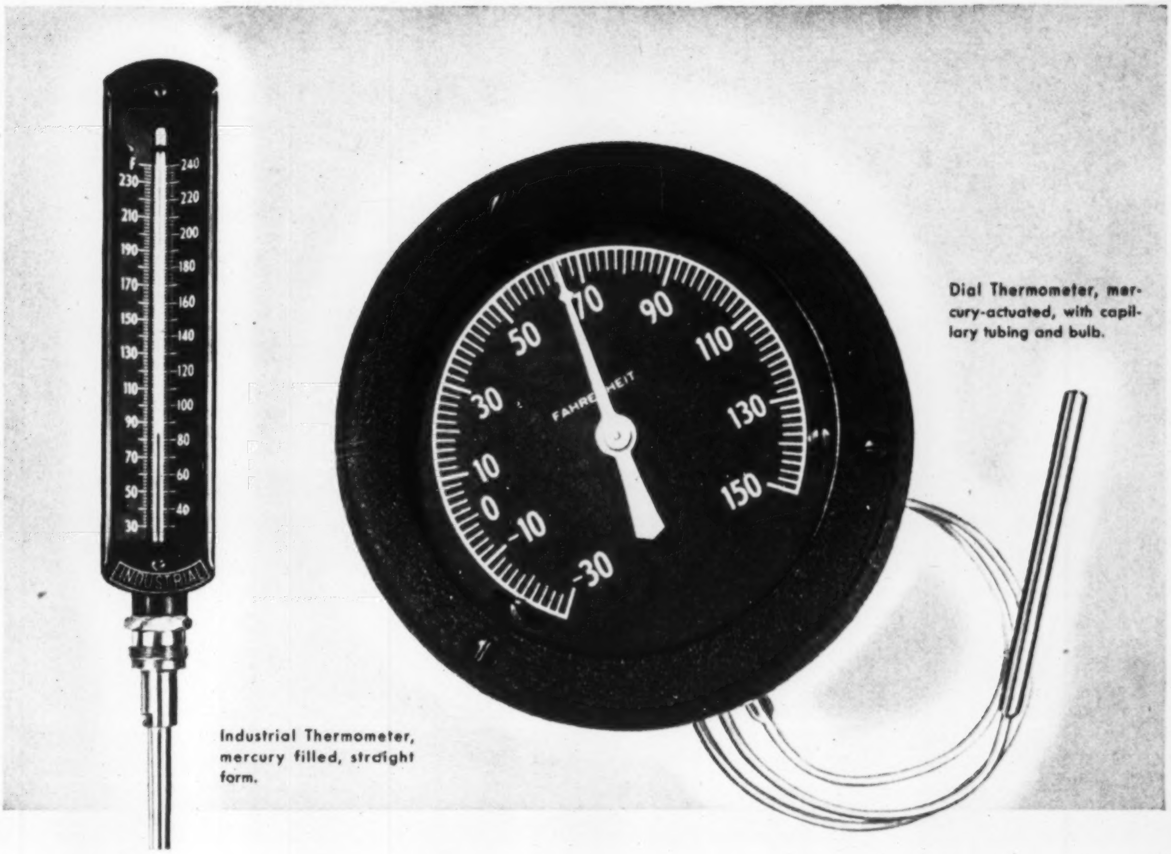
New Single Cabinet

Central Heater with provision for later installation of cooling unit.

WRITE FOR LITERATURE

OHN ZINK COMPANY

Tulsa 5, Oklahoma



Industrial Thermometer, mercury filled, straight form.

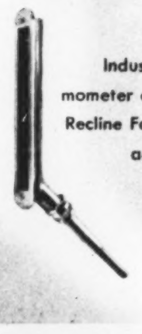
Dial Thermometer, mercury-actuated, with capillary tubing and bulb.

HAVE YOU AN INDUSTRIAL TEMPERATURE TO TAKE?

Whenever an industrial temperature has to be taken there is a USG thermometer for the job. You have your choice of the Industrial Type in all sizes, and mounting forms with standard or protected stems; or the Dial Type in a variety of sizes, case styles, mountings, ranges, and connections. Gas, mercury or vapor-actuated.

For typical applications of commercial and approved Navy Standards, covering dimensional information and the use of bushings, flanges, sockets and special tubing, send for Catalogs 100 and 200.

Special thermometers for dough testing, milk testing, fuel gas, candy, solder baths, varnish, canning, vulcanizing and other unusual processes.



Industrial Thermometer of the 45° Recline Form. There are 5 other standard forms.

Dial Thermometer with bottom-connected rigid stem, one of many USG types available.

UNITED STATES GAUGE

United States Gauge
Division of American Machine and Metals. Inc.
Sellersville, Pa.

Gentlemen: We are interested in USG ☐ Industrial Thermometers; ☐ Dial Thermometers. ☐ Please send us your catalog. ☐ Have your man call. No obligation, of course.

Name________________ Title________

Company________________

Address________________

City________________ Zone________ State________

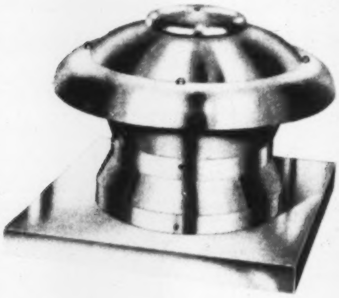
SEE THE *Improved*

JENN-AIR
POWER EXHAUSTERS

ON DISPLAY AT THE SHOW
BOOTH 1010

FOR WALL

FOR ROOF



NOW . . .

Even More Efficient . . . Even More Quiet

● Be sure to see the exciting, new features JENN-AIR has added to its famous "Low-Contour" POWER EXHAUSTERS. Easy as ever to install and service, they're even more efficient and quiet in operation. Remember—only JENN-AIR is made of rugged, lightweight aluminum . . . only JENN-AIR is so easily adapted to such a wide range of ventilating requirements. Visit Booth 1010 and see for yourself, why, all over the nation, more and more engineers every year are specifying JENN-AIR.

If you are unable to attend the show, get the complete story by writing for our illustrated brochure.

JENN-AIR PRODUCTS COMPANY
ARCHITECTS AND BUILDERS BUILDING · INDIANAPOLIS 4, IND.

REGULATORS and CONTROLLERS

for the Regulation and Control of Pressure, Temperature, Flow and Liquid Level • • •

LESLIE COAST-TO-COAST SERVICE—In all principal industrial centers LESLIE factory-trained engineers are available to help with any control problem involving steam, liquid, air or gas. Look for LESLIE REGULATORS under "Valves" or "Regulators" in your classified telephone directory.

INTERCHANGEABILITY—All internal parts of LESLIE Regulators are dimensionally interchangeable and have maximum interchangeability in all sizes and classes.

LESLIE EXCLUSIVE FEATURES—*at no extra cost!*

- ★ *Stellited Seat Rings*
- ★ *Hardened Stainless Steel Main Valves, 500 Brinell*
- ★ *Corrosion Resistant Springs*
- ★ *Hardened Stainless Steel Cylinder Liners, 500 Brinell*

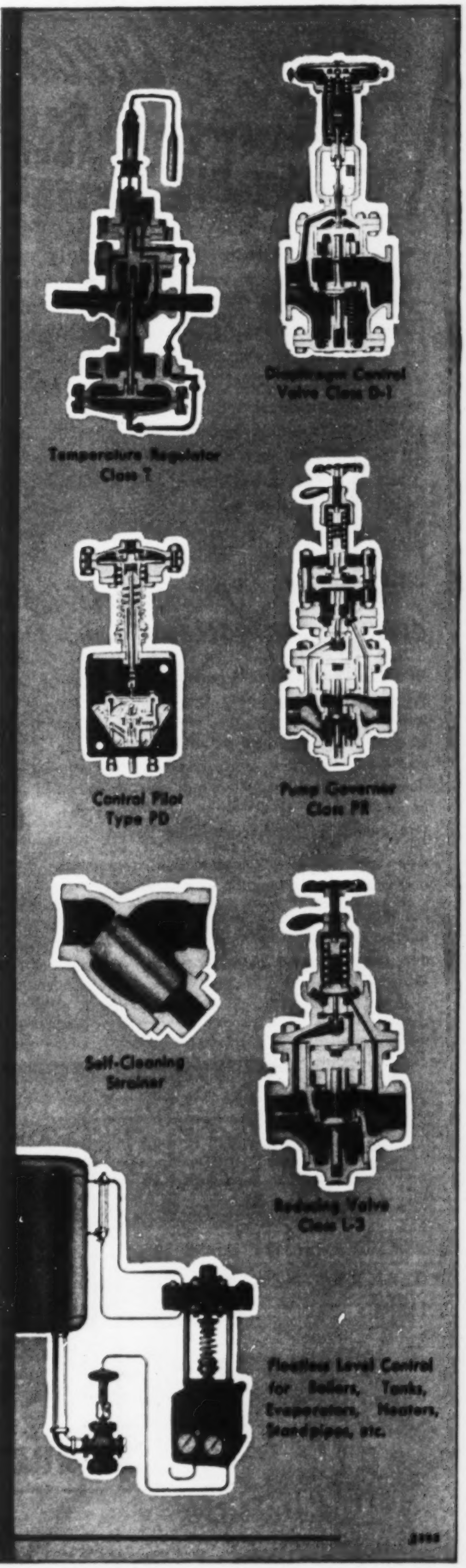
Supplied as standard equipment.

LESLIE PRESSURE REDUCING VALVES, PUMP GOVERNORS, and TEMPERATURE REGULATORS—Self-contained, spring loaded, internal pilot piston or diaphragm operated with stellited seat rings, hardened stainless steel trim, bronze, iron, or steel construction. ALL LESLIE Regulators feature:

- ★ *High accuracy of regulation*
- ★ *Single-seated construction for positive dead-end shutoff*
- ★ *Quick valve action for sudden load changes*
- ★ *Maximum resistance to corrosion and wear*
- ★ *Maximum spring range—from minimum to maximum of the range without change of spring or diaphragm*

TRADE
LESLIE
MARK

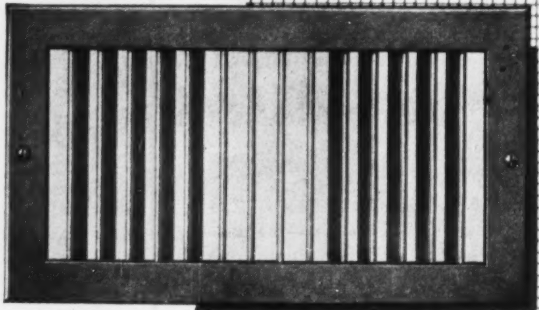
LESLIE CO.,
237 Grant Avenue, Lyndhurst, New Jersey


Temperature Regulator
Class T
Diaphragm Control
Valve Class D-1
Control Pilot
Type PD
Pump Governor
Class PR
Self-Cleaning
Strainer
Reducing Valve
Class L-3
Floatless Level Control for Boilers, Tanks, Evaporators, Heaters, Standpipes, etc.

Auer "Streamliners"

. . . answer all Register and Grille requirements for high-velocity air conditioning systems

- Efficient diffusion and absolutely quiet operation at high velocities are essential requirements of the outlets in the ideal air conditioning installation. Auer "Streamliner" registers and grilles give you both. The "Streamliner" series provides a full range of sizes, in models with single bank of adjustable bars (vertical or horizontal) double banks of adjustable bars (vertical in front and horizontal in back, or reverse), also all four types with multi-louvre valves at back controlled by a lever on the face.



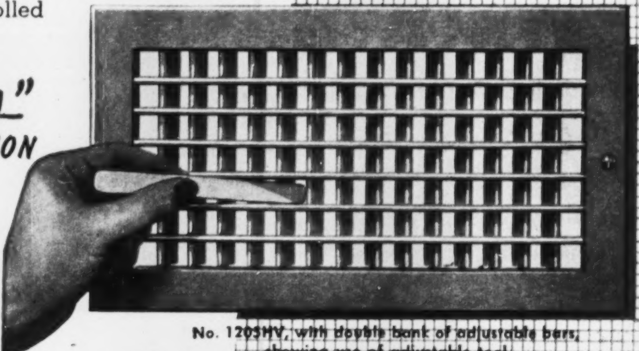
No. 1005V, with single bank of adjustable bars

Auer "Streamliners"
QUALITY CONTROLLED PRODUCTION

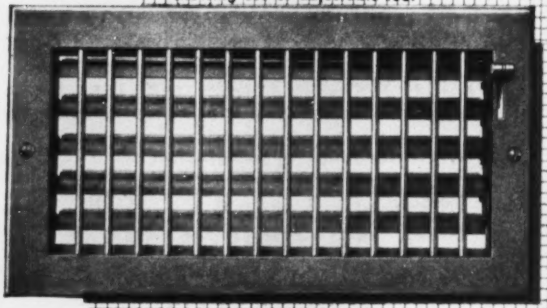
When you install Auer "Streamliners", you have the assurance of accurate dimensions and uniform high quality—the result of Auer's system of strict quality control of production. Smartly styled for attractive appearance, and expertly designed according to correct aerodynamic engineering principles, they provide every feature demanded by discriminating buyers.

Auer also makes a complete line of registers and grilles for residential installations.

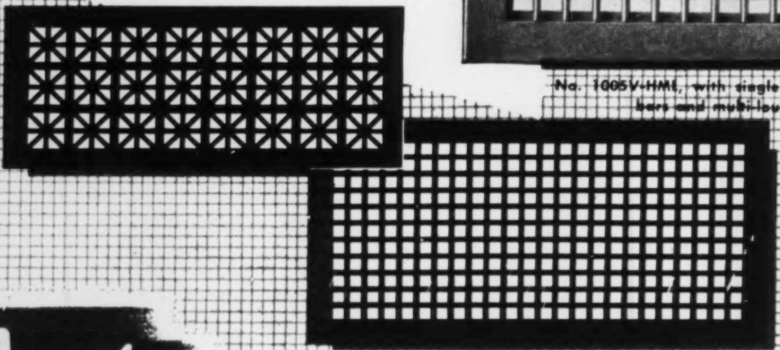
For information on the complete Auer line, ask for the Auer "Register Book." For information on our quality line of perforated grilles, ask for Catalog "G".



No. 1205HV, with double bank of adjustable bars, showing use of adjustable tool



No. 1005V-HML, with single band of adjustable bars and multi-louvre valves



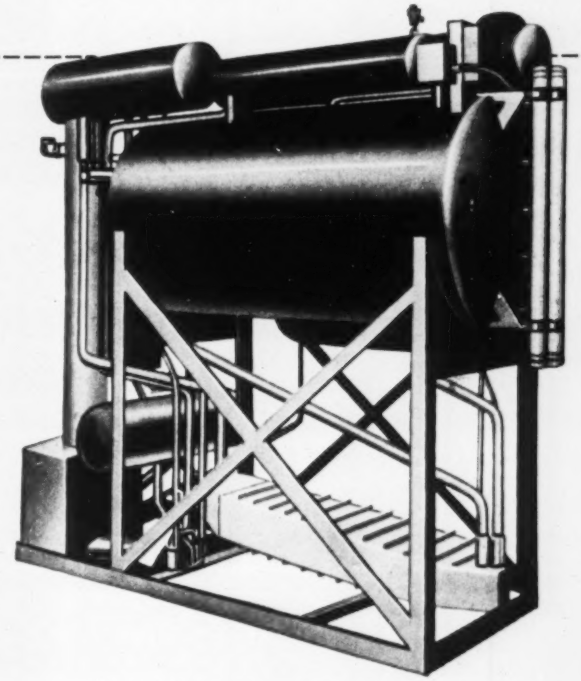
Auer Perforated Grilles are available in wide variety of pattern styles made to order of materials and in sizes to meet individual specifications.

Auer REGISTERS and GRILLES

THE AUER REGISTER CO. 6600 CLEMENT AVE. • CLEVELAND 5, OHIO

Canadian Distributor—Marchand Furnace Ltd., Tilbury, Ont.

Solve cooling problems with waste heat or low-cost steam!



FLEXIBLE

SERVEL

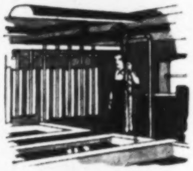
WATER CHILLER

meets all 3
cooling needs

1. AIR CONDITIONING

The adaptable Servel 25-ton Water Chiller—operating on any source of steam—uses water as the refrigerant to provide economical temperature and humidity control in large buildings and factories. No expensive duct systems are required!

2. PROCESS COOLING



Because it operates with no moving parts on the time-proved absorption refrigeration principle, you can depend upon the Servel 25-ton Water Chiller for continuous high-efficiency cooling of liquids for various manufacturing and formulating processes.

3. INDUSTRIAL PRECOOLING

You can use the unusually flexible Servel 25-ton Water Chiller to precool air for increased capacity and improved performance of air compressors and internal combustion machines. The Water Chiller also serves other money-saving precooling purposes.

5-YEAR WARRANTY! Every Servel 25-ton Water Chiller is backed by a full 5-year warranty. Because it has no moving parts, the Servel Water Chiller operates quietly and without vibration. Add to these advantages its extremely compact size and light floor weight and you'll appreciate why it can be installed on any floor with most economical piping arrangement. May be installed singly or in multiple as required. Mail the coupon below today for complete information.

Servel

the name to watch for great advances in . .

AIR CONDITIONING ✓ REFRIGERATION

MAIL THIS COUPON TODAY

SERVEL, INC., Dept. HP-1, Evansville 20, Indiana

Please send me further information about application flexibility of the Servel 25-ton Water Chiller.

Name

Firm

Address

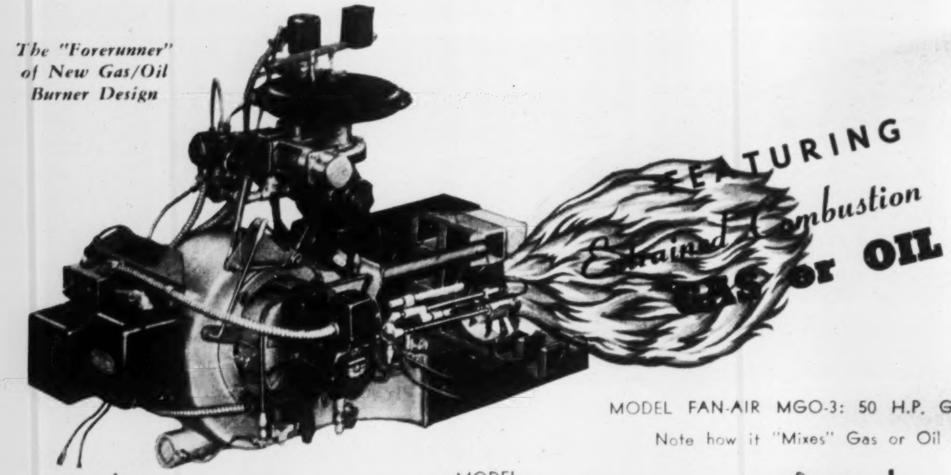
City Zone State

AN ENTIRELY *NEW* CONCEPTION IN

COMBINATION AUTOMATIC MECHANICAL DRAFT "PACKAGED" GAS-OIL BURNERS

Now the METTLER CO., engineers have met the trend and need of the Gas Industry by perfecting the popular ENTRAINED COMBUSTION BURNER CASTING for adaptation of OIL FUEL, representing the first major advance in DUAL FUEL BURNERS. Not a "copy" nor a compromise but an entirely new ENGINEERED product.

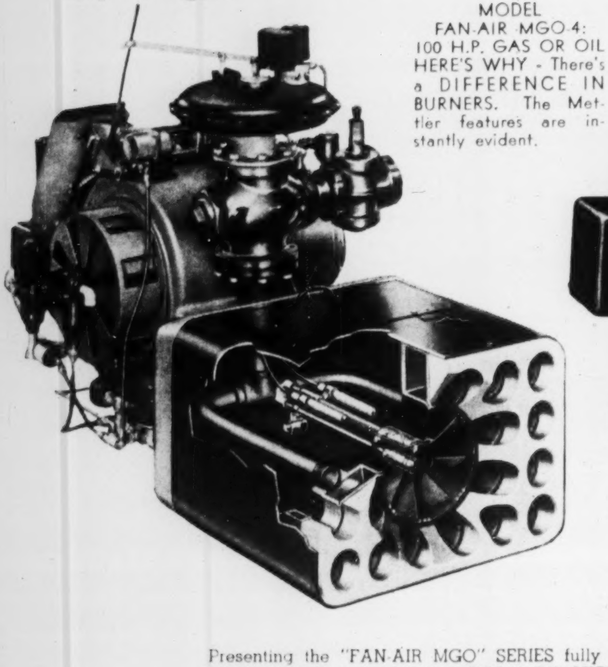
The "Forerunner" of New Gas/Oil Burner Design



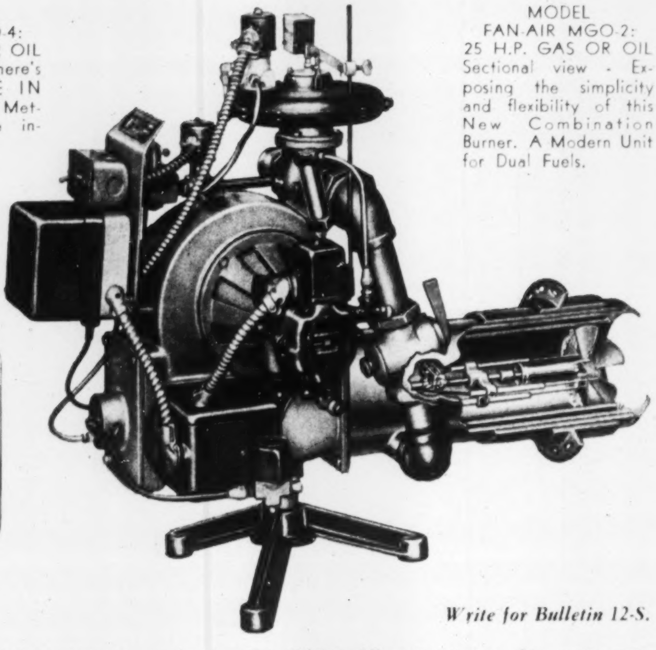
MODEL FAN-AIR MGO-3: 50 H.P. GAS OR OIL

Note how it "Mixes" Gas or Oil and Air

MODEL
FAN-AIR MGO-4:
100 H.P. GAS OR OIL
HERE'S WHY - There's a DIFFERENCE IN BURNERS. The Mettler features are instantly evident.



MODEL
FAN-AIR MGO-2:
25 H.P. GAS OR OIL
Sectional view - Exposing the simplicity and flexibility of this New Combination Burner. A Modern Unit for Dual Fuels.



Write for Bulletin 12-S.

Presenting the "FAN-AIR MGO" SERIES fully automatic mechanical draft **combination GAS & OIL BURNERS** featuring the Mettler Rectifier Spark Ignited Safety Pilot with dependable electronic flame failure protective devices for both fuels.

A simple **"flip of the switch"** or automatic remote control, changes from GAS to OIL or in reverse. Air register synchronized to both fuels: delayed oil valve prevents smoky starts: full gas and oil retention: centrally assembled appurtenances instantly removable: no complex adjustments necessary: GAS or OIL and AIR mixed within burner head: It's an exclusive METTLER design with patents pending. **Nothing else like it on the market.**

THE "FAN-AIR" GAS OR "FAN-AIR MGO" SERIES OF Dual Fuel BURNERS are WORTHY OF YOUR SPONSORSHIP

EXPERTO CREDE

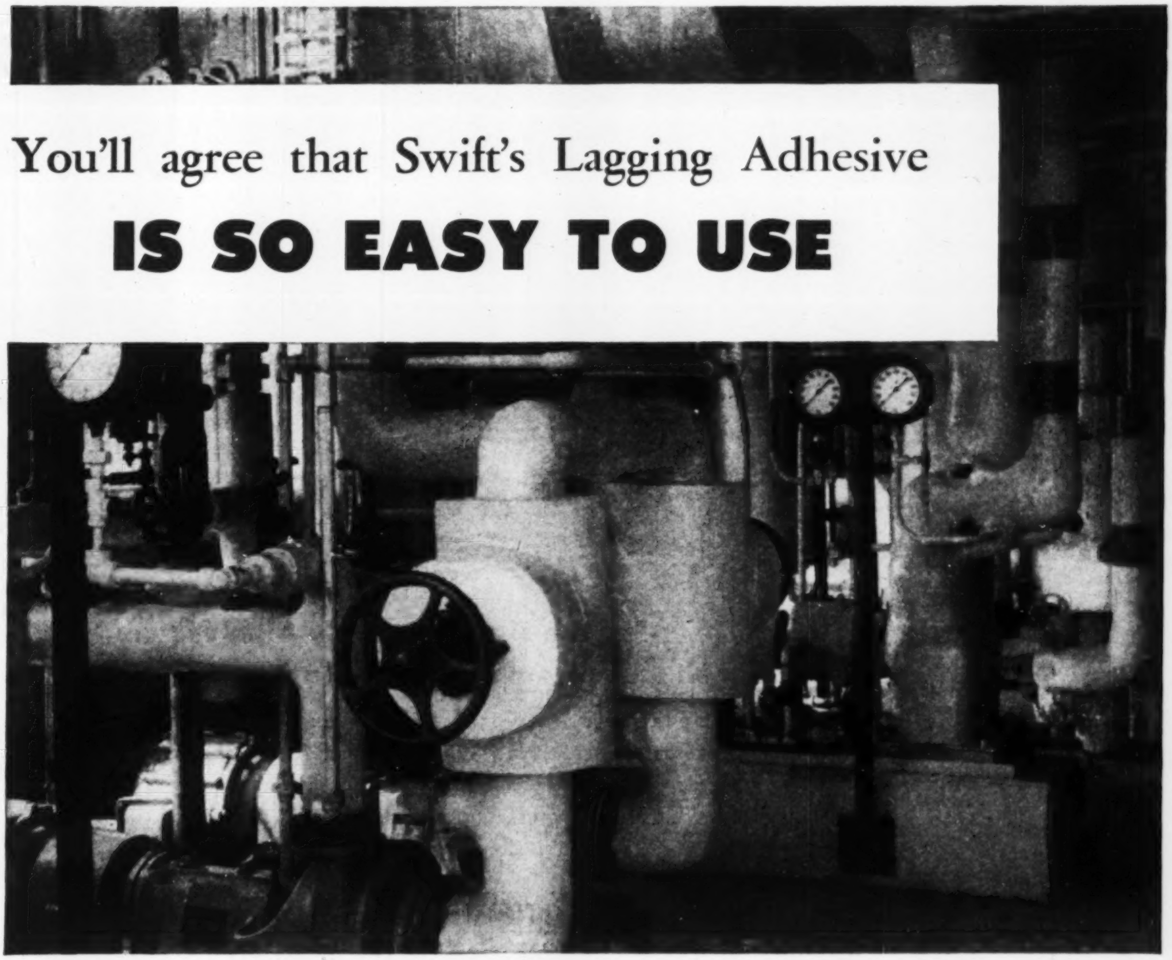
4366
WORTH STREET

THE METTLER CO. INC.

LOS ANGELES 63
CALIFORNIA

You'll agree that Swift's Lagging Adhesive

IS SO EASY TO USE



Tops as a cement and size in the application of modern insulations

Whether the installation calls for the binding of loose insulation after shaping or the sizing of lagging cloth, you can count on Swift's Lagging Adhesive for extra-efficient performance. Application is easy. Brushes on quickly without dragging (at the original consistency). Can be diluted with *plain water* if desired.

Fast setting . . . dries quickly to a strong continuous film.

Safe! Does not support combustion . . . a synthetic resin emulsion, it's free of inflammable solvents and contains fire retardants.

Moisture-resistant . . . protects insulations against sogginess.

Mold-resistant . . . protects against mold and vermin attack.

Saves paint . . . an excellent undercoating for paint, it prevents penetration into lagging cloth . . . helps you go farther with less paint.

Call **SWIFT** *first* for **ADHESIVES**

Swift & Company
Adhesive Products Department
Chicago 9, Illinois

(This offer expires February 28, 1953)

Please send me your ____-gal. introductory trial shipment of Swift's Lagging Adhesive at the quantity price, to be tested for use in our operations. We understand, if not fully satisfactory, it may be returned for credit at your expense.

Name ____________________

Firm Name ____________________

Address ____________________

City ____________ *Zone* ______ *State* ____________

The Easy, Low-Cost, Better Way to

INSULATE

Underground Heated Piping

regardless of size, number, or arrangement

"Z"-crete® THE MODERN MONOLITHIC INSULATION

Placing "Z"-Crete Insulation, 2-pipe conduit.

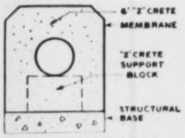
Conduit containing 10 pipes at famous Mid-Western hospital. Pipes anchored to base, support blocks in place prior to pouring of "Z"-Crete. "Z"-Crete system is adaptable to any pipe layout.

For the simplest single pipe system, or the most complex multiple pipe installation...

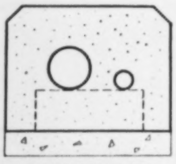
No pipe arrangement too tough for this versatile insulation—"Z"-*Crete* affords permanent insulating efficiency—forms a solid, monolithic protection around one pipe or a dozen in the same conduit. Hundreds of thousands of feet in use, in every part of the country, every soil condition. Efficient—because there's six inches of insulation between pipe and outside of conduit. Permanent—made of inorganic, rotproof, insulating concrete... monolithic pour assures restricted water movement around the assembly. And you'll find it's usually the most economical system to install.

A new booklet, just out, gives full information on this modern method of insulating underground heated piping. Write, wire or phone for a copy now—no obligation, of course.

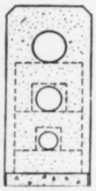
Use "Z"-Crete for any heated underground system


6" "Z" CRETE
MEMBRANE
"Z" CRETE SUPPORT BLOCK
STRUCTURAL BASE

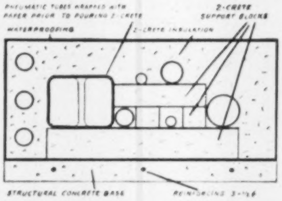
SINGLE PIPE CONDUIT



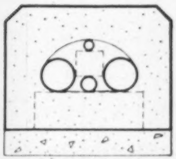
2-PIPE CONDUIT



PIPE-OVER-PIPE


PNEUMATIC TUBES WRAPPED WITH PAPER PRIOR TO POURING Z-CRETE
Z-CRETE SUPPORT BLOCKS
WATERPROOFING
Z-CRETE INSULATION
STRUCTURAL CONCRETE BASE
REINFORCING 3-½ 6

MULTIPLE PIPE CONDUIT



MULTIPLE PIPE CONDUIT WITH STEAM TRACER

"Z"-crete®
DIVISION
ZONOLITE COMPANY
135 S. LaSalle St. • Phone: CEntral 6-5885 • Chicago 3, Ill.

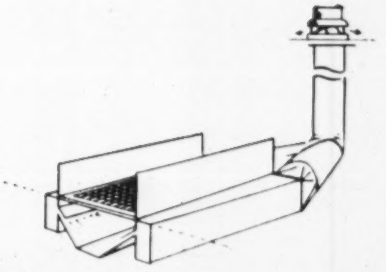
"Z"-Crete is sold and installed only by experienced, licensed applicators, under U. S. and Canadian Letters of Patent. There is one near you. Name furnished with your copy of "Z"-Crete booklet.

SEE THE "Z" CRETE EXHIBIT
ELEVENTH
Air Conditioning Exposition
INTERNATIONAL HEATING & VENTILATING EXPOSITION
International Amphitheatre, Chicago
January 26-30, 1953
BOOTH NO. 2-131

New AIR VANS®

WITH PATENTED

Scroll Effect Develop up to 4" Static Pressure



NEW BELT DRIVEN UNITS HANDLE UP TO 65.000 CFM

For the first time a direct connected power roof exhauster has been designed with backwardly curved fan wheel to handle high static pressures and large volumes of air.

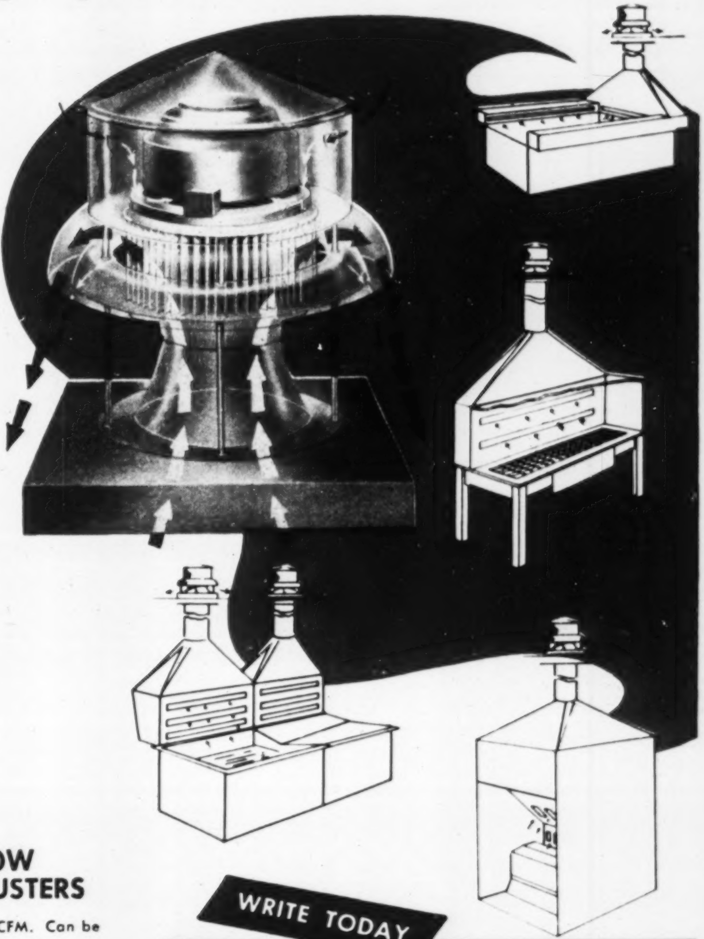
Four years of research into power exhauster design has shown conclusively that this performance is only possible when *scroll effect* is present. The Air-Van is the only unit with this feature.

It means you can now solve most ventilation problems with economical power roof exhausters.

The thousands of industrial processes which demand high performance against high static pressure are well within the range of these new Air-Vans. Like all Air-Vans they have motor out of the air stream, low silhouette, weatherproof outlet, and a *positive air seal off* to assure protection of the motor.

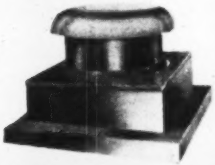
Certified Ratings—all units have been tested by an independent laboratory using the specified methods of the ASH&VE and NAFM. These are tests of the entire unit, not just components. They are certified performance tests—*not* theoretical or interpolated guesses.

New Wheels on Direct Drive Units. You choose from three different wheels both backwardly and forwardly curved. This allows you to practically tailormake the unit you want with respect to noise, volume and horsepower.



AIR-MAX

AXIAL FLOW POWER EXHAUSTERS



Capacities 1700-44,000 CFM. Can be modified to serve as both summer and winter air supply complete with tempering coils. Also available as a high upward discharge unit.

The GALLAHER Company

4108 Dodge Street • Omaha, Nebraska

WRITE TODAY

The Gallaher Company
4108 Dodge St.
Omaha, Nebraska H-1

Gentlemen: Please send me complete information on the new belt driven Air-Vans as soon as it is ready.

NAME ______________________

ADDRESS ______________________

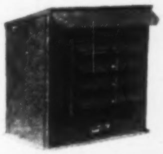
CITY ______________ STATE ______________

WE HAVE A PLAN THAT HELPS YOU—

Peerless offers you a big extra. As part of an extensive sales plan, the Peerless engineering staff is available to anyone wishing more detailed fan and blower information for any job, small, medium or large. A collect call to Peerless will put this engineering staff to work on your problem. If necessary, Peerless will fly a man to your doorstep for consultation.

Besides this direct-to-you engineering service, Peerless has a national network of salesmen, wholesalers and contractors. This sales force features the Peerless complete line of competitively priced fans and blowers, equipped with job-matched Peerless-built motors. Thus, the fans and blowers are guaranteed with undivided responsibility.

Why not take advantage of this sales plan, geared to fit your needs? Simply call, write or wire us collect regarding your present jobs, or for a catalog of the complete line with specifications, dimensions and drawings.

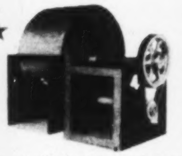


PENTHOUSES

Economical in cost, installation and operation. Can be matched with any Peerless Electric fan. For factories, laundries, stores, clubs and auditoriums.

BLOWER-FILTER PACKAGE UNIT

A complete unit, including filters, ready for installation. A heavy-gauge steel unit, modern in design, with baked enamel finish. Has balanced wheels, large access door and direct-belt drive. Operates quietly and is easily serviced.



BELT DRIVE UTILITY BLOWERS

A completely assembled blower with an adjustable motor pulley for various speeds. Housings can be tilted when exhaust angles are required.

BELT DRIVE EXHAUST FANS

For installation in ducts where low static pressure resistance is encountered. Built for continuous performance with totally enclosed ball-bearing motors. Moves dusty or humid air.

INDUSTRIAL EXHAUST FANS

A vital part of the full Peerless line! For warehouses, foundries, storerooms, etc. Continuous duty fan with totally enclosed ball-bearing motors. Can be horizontally or vertically mounted. Stock for more industrial sales!

FURNACE BLOWERS

A ruggedly-constructed unit that cuts installation time. Positive belt drive with job-matched motor gives quiet, smooth performance. Ideal for quick installations and added profits.

PRESSURE BLOWERS

High pressure air moving or cooling problems are quickly solved with the Peerless Pressure Blowers. Blades are dynamically balanced and self-cleaning. Heavy-gauge steel base and housing.

DIRECT DRIVE UTILITY BLOWERS

For boiler rooms, restaurants, washrooms, etc. Housings constructed of 16-gauge steel. Peerless job-matched motors are available for all types of electrical currents.

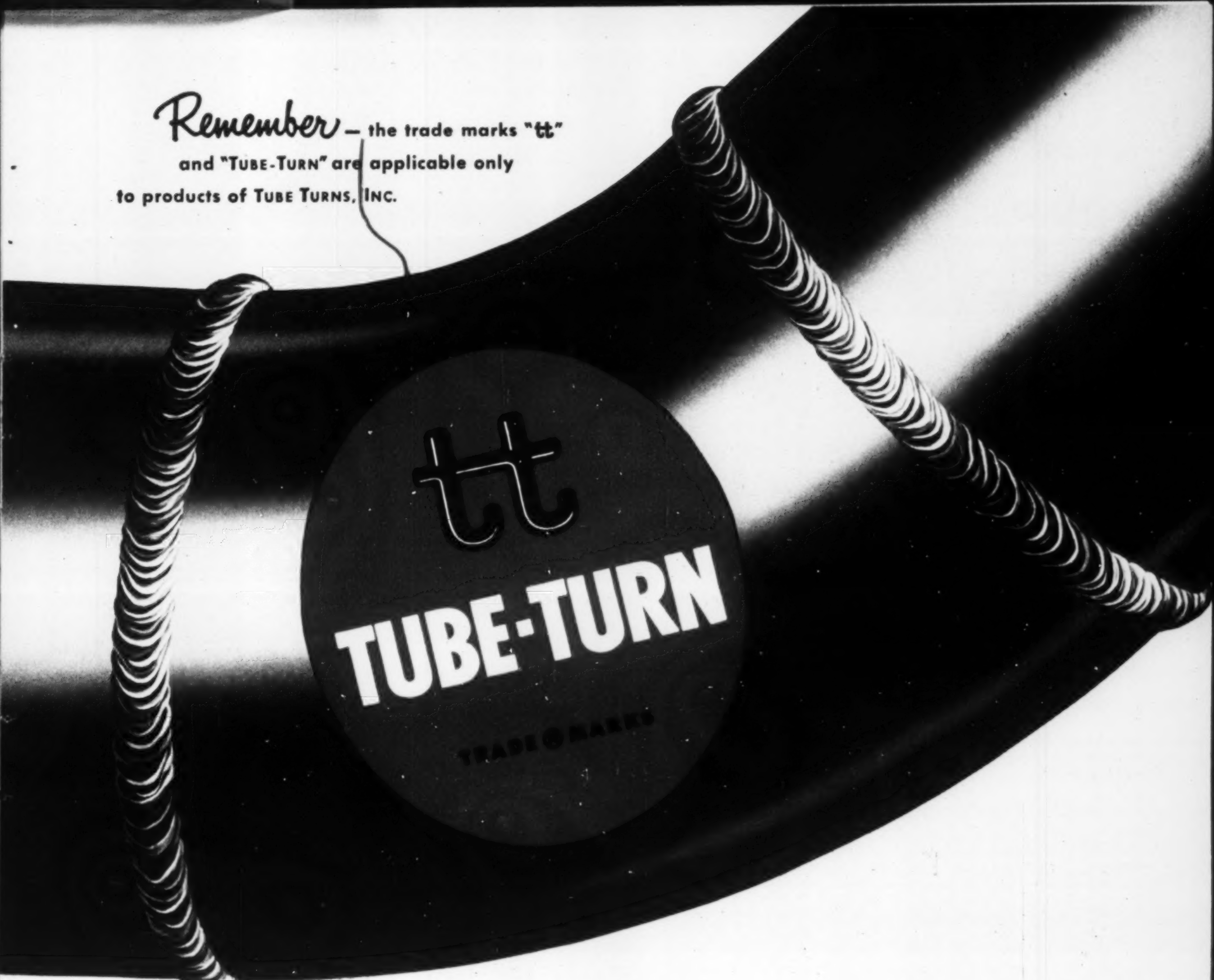
SMOOTHEST PERFORMERS ON THE MARKET

Peerless Electric

FAN AND BLOWER DIVISION

THE PEERLESS ELECTRIC COMPANY
1409 WEST MARKET ST. . WARREN, OHIO

Remember – the trade marks "tt" and "TUBE-TURN" are applicable only to products of TUBE TURNS, INC.



Engineered

FOR MINIMUM PRESSURE DROP

THIS TUBE-TURN Welding Elbow has full radius conforming to A. S. A. Standard B 16.9. The radius is not reduced by tangents. The interior walls are consistently smooth and perfectly circular . . . important production features which minimize pressure drop.

This attention to engineering detail pays off in your piping systems. When you specify TUBE-TURN Welding Fittings and Flanges, pressure drop is at a minimum and uniformity of fit-up is assured.

You'll find a TUBE TURNS' Distributor in every principal city. Call him for good service in good connections.

Be sure you see the double "tt"

TUBE TURNS, INC. LOUISVILLE 1, KENTUCKY

DISTRICT OFFICES: New York · Philadelphia · Pittsburgh · Chicago · Houston · Tulsa · San Francisco · Los Angeles
Wholly owned subsidiaries: TUBE TURNS OF CANADA LIMITED, CHATHAM, ONTARIO
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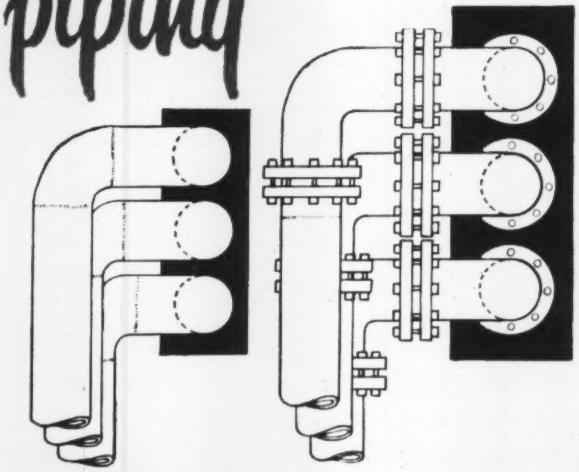
CONTACT WELDED PIPING
SIMPLIFIES THE JOB

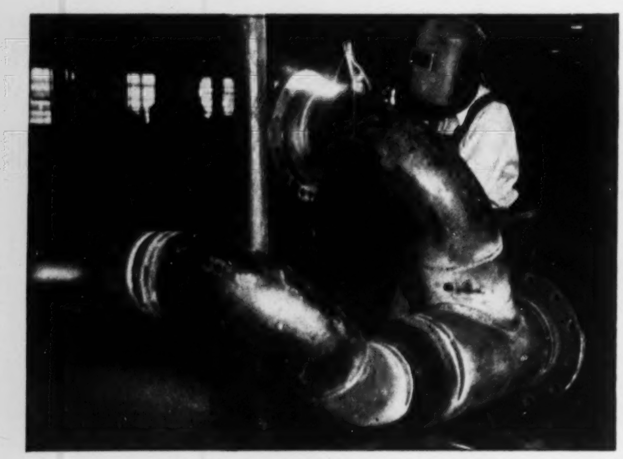
COMPACT *Welded piping* SIMPLIFIES THE JOB

You can simplify design, save valuable space and speed up the piping job by specifying *welded construction* with Tube-Turn Welding Fittings. Welded joints are virtually flush with the pipe. Pipes can fit snugly together in tight corners . . . against wall or ceiling . . . or around equipment. And welded piping requires little elbow room to install . . . and to insulate. The true circularity and uniform wall thickness of Tube-Turn Welding Fittings simplifies fit-up and assures a job well done under crowded working conditions.

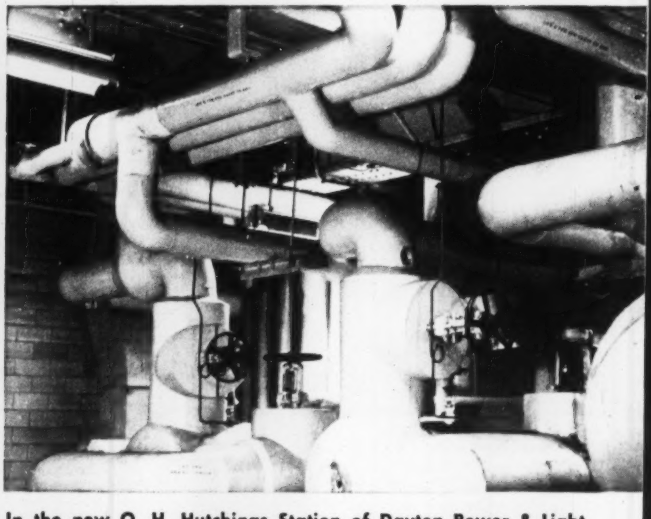
This is just one reason why it pays to specify *welded piping*. It's stronger, lighter, streamlined, economical to install, insulate and maintain.



Example: The welded assembly on left takes a third less space than comparable flanged assembly.



Bring on your tight corners! Entire sections of welded piping can be shop-fabricated and erected as a unit with a few simple tie in welds or flange connections to valves or containers.



In the new O. H. Hutchings Station of Dayton Power & Light Company. Piping for deaerators and feed water heaters is compact, streamlined and permanent. Directional changes are made with TUBE-TURN Welding Fittings.

Want Dimension Data?

Tube Turns, Inc. has compiled a handy folder of charts covering dimensions and weights of TUBE-TURN Welding Fittings and Flanges. If you'd like a free copy just send this coupon.

TUBE TURNS, INC., Dept. A-2
224 East Broadway, Louisville 1, Kentucky

Your name ....

Position ....

Company ....

Nature of business ....

Address ....

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"tt" and "TUBE-TURN"
Reg. U. S. Pat. Off.

TUBE TURNS, INC.

LOUISVILLE 1, KENTUCKY

Miracle Adhesives Corporation

Devices, Inc. (Affiliate)
Manufacturer of Miracle Surface Anchors
214 East 53 St., New York 22, N. Y.
Representatives in all Principal Cities and in Canada

MIRACLE SURFACE ANCHOR METHOD CUTS COSTS . . . SAVES TIME

Miracle Surface Anchors consist of perforated metal plates 2 in. x 2 in. or 2¾ in. x 2¾ in.—to the center of each is welded a nail, bolt, spindle, prong, or threaded stud. These Anchors are zinc and dichromate finish to resist corrosion. (Figures 2, 3 and 6.)

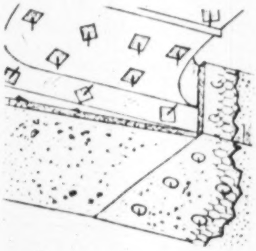

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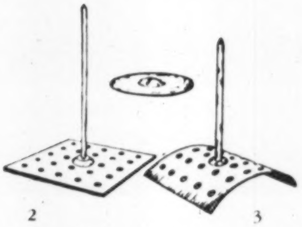
Fig. 1: Attaching Corkboard with Miracle Spindle Anchors to Ducts



2 3

Fig. 2: Miracle Spindle Anchor and Washer
Fig. 3: Miracle Curved Spindle Anchor for Convex surface or corrugated metal

Miracle Spindle Anchors— When attached to ducts, walls, ceilings, ship hulls, deck heads, etc., will firmly support various types of insulation, such as Cork, Batt and Fiber Glass, by impaling the insulation (and wire mesh, if any) on the spindle (Fig. 1). Self clinching washers to fit over the spindles are available (Fig. 2). Spindle Anchors are also made on a curved plate for attaching to convex surface of corrugated metal or asbestos board (Fig. 3).

4

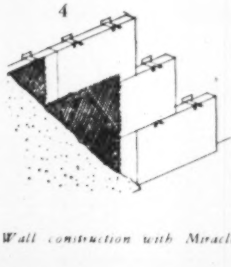


Fig. 4: Wall construction with Miracle Pronged Anchors

5

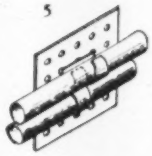


Fig. 5: Miracle Pronged Anchors are also used for supporting small cables, tubing, air lines, etc.

6

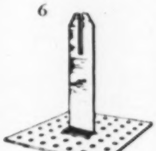


Fig. 6: Miracle Pronged Anchor

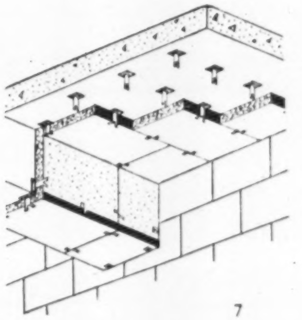


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Fig. 7: Ceiling construction with Miracle Pronged Anchors

Miracle Pronged Anchors—When attached to ducts, walls, ceilings, etc., support foam glass and other types of block insulation. Pronged Anchors are set between rows of block insulation and when the latter is to be left exposed, prongs are bent in reverse direction over the blocks. When wire mesh is to be added for mastic finish, one prong of each Anchor is bent over the block insulation—the other prong penetrating the wire mesh and then bent over it before applying mastic (Figs. 4 and 7).

Advantages:—1. Cut costs because of faster application. 2. No wiring—no metal corner beads—no preliminary spotting of ducts or insulation with mastic necessary. 3. Ideal for cumbersome installations such as fan housings and similar equipment.

MIRACLE "Z" CLIPS

Miracle "Z" Clips consist of 2 in. x 2 in. or 2 in. x 4 in. perforated 20 gauge steel. "Z" Clips, because of their hinged construction, allow for any irregularities in the surface to which they are bonded. "Z" Clips provide an effective and economical means of attaching wallboard, plasterboard, or insulation board to the inside of exterior walls when an air space is required between the wall and the board. The "Z" Clip method completely eliminates necessity for studs, or furring strip (Fig. 8, 9 and 10).

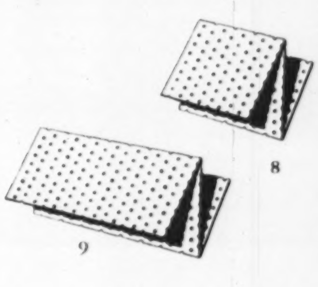

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Fig. 8: Cat. No.—Z-22 Dimensions—2 in. x 2 in.

Fig. 9: Cat. No.—Z-24 Dimensions—2 in. x 4 in.

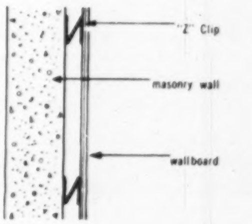

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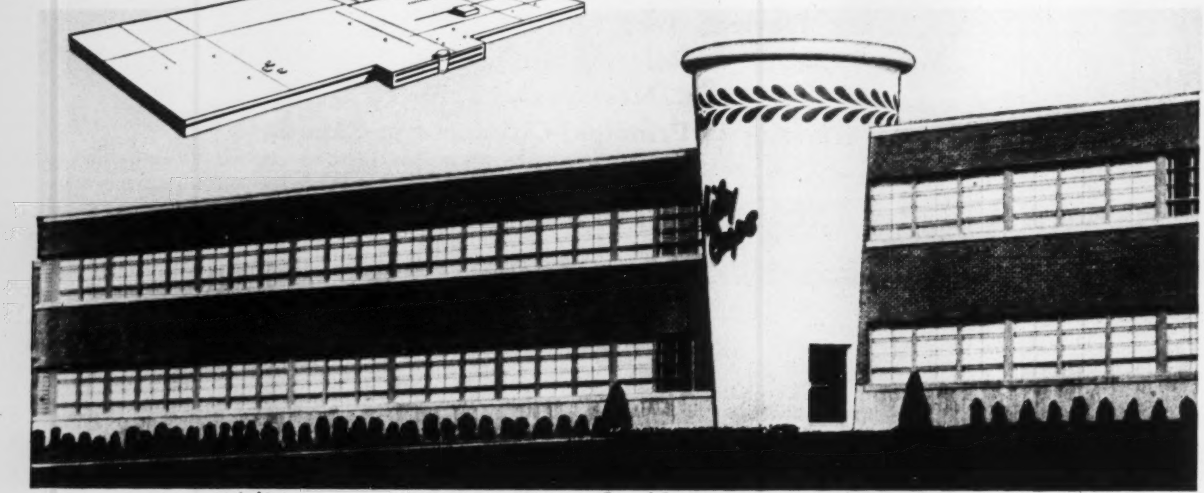
Fig. 10: Vertical wall section illustrating Miracle "Z" Clips in position

Adhesives:—For Anchor installations use Miracle Anchor Adhesive for temperatures up to 200 F, or Miracle HT-2 for temperatures between 200 F and 450 F. For cold room or extra low temperatures send for specific information.

newest *Lily-Tulip* plant



Architects: HURLEY & HUGHES, NEW YORK, N. Y. *General Contractor:* P. KRETZER & SON, FLUSHING, N. Y.
Heating, Ventilating and Piping Engineers: ABBOTT, LESTER & CO., NEW YORK, N. Y.

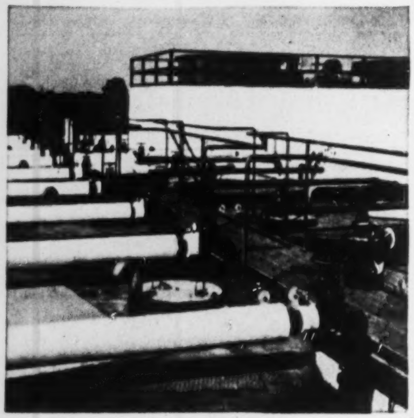
equipped with JENKINS VALVES for peak operating efficiency

"All this to make a paper cup!" exclaim visitors, viewing the more than 1000 ft. long modern plant of the Lily-Tulip Cup Corporation completed recently in Springfield, Mo. Even more impressive is the amount of long-range planning required to attain and *maintain* peak operating efficiency in so massive a building.

With its eleven different service pipelines, as well as a giant air-conditioning and humidity control system, the choice of valves for this plant required future-minded planning. Only after careful comparison of performance in all types of services, and of maintenance economy records, was the decision made to standardize on Jenkins Valves.

This confidence in the demonstrated *extra measure* of efficiency and economy provided by Jenkins Valves is shared by plant operating management in every type of industry.

Despite this extra value, *you pay no more* for Jenkins Valves. For new installations, for all replacements, let the Jenkins Diamond be your guide to lasting valve economy. Jenkins Bros., 100 Park Ave., New York 17.



Miles of piping includes service lines for water, steam, gas, compressed air, vacuum and liquid paraffin, as well as fire protection lines with 4,500 sprinkler heads. Gate valves on water lines feeding the evaporative roof cooling system are shown above, some of the thousands of Jenkins Valves installed at control points throughout the plant.

JENKINS
LOOK FOR THE DIAMOND MARK
VALVES
SINCE 1864
JENKINS
Jenkins Bros

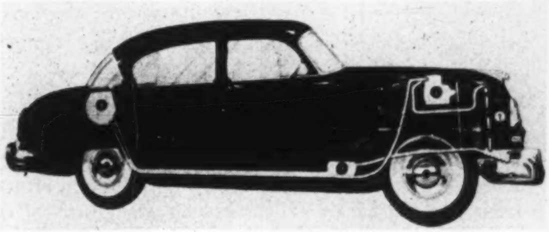
EQUIPMENT DEVELOPMENTS...

Plastic Air Filter

HPAC 1—Full scale production of "Pliotron," a washable plastic air filter that traps and holds pollen, soot and dust particles by static electricity, has been announced. . . . The filtering agents contain an electrostatic charge. When air is forced through the plastic material, it takes on an additional charge. The charge then works as a magnet. The filter is cleaned by rinsing in clear water and may be replaced without drying. [Manufacturer: Goodyear Tire & Rubber Co., Dept 722 Special Products, Mechanical Goods, Plant Two, 1144 E. Market St., Akron 16, Ohio.]

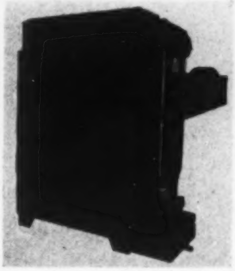
Car Cooler

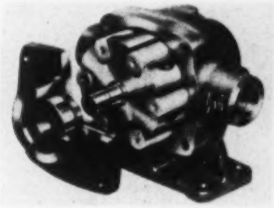
HPAC 2—Air conditioning system for automobiles. . . . Fresh air flows from an outlet in the deck behind the rear seat and is diffused through the interior, creating a mildly pressurized effect. Heat-dissipating condensers are mounted in the front of the car. A V-type four-cylinder compressor is mounted on the right side of the engine. In normal city traffic, the system operates on a 2 hp requirement taken from the car engine crankshaft. The evaporator and cool air discharging unit is located directly under the shelf panel at the top of the trunk compartment. [Manufacturer: Chrysler Airtemp, Div. of Chrysler Corp., 1600 Webster St., Dayton 1.]



Humidity and Temperature Stabilizer

HPAC 3—Apparatus for drying or moistening of atmospheric air by the "liquid contact method." Air is treated to fix relative humidity and temperature independently. Filtered fresh air enter a spray chamber which either adds moisture or removes it by absorption or condensation. The temperature or absorbent concentration of the liquid determines the moisture content of the air leaving the chamber. The final temperature is fixed as a separate function. Refrigerated water or "Hygrol", a stable organic absorbent liquid, is used. [Manufacturer: Niagara Blower Co., 405 Lexington Ave., New York 17.]





Above: Pump

Left: Humidity control unit

Roller-Type Pump

HPAC 4—An 800 rpm roller-type pump designed for belt and pulley or direct drive operation on electric motors or gas engines. . . . "6000 series" is adapted to handle wettable powder mixtures as well as emulsified solutions. According to the manufacturer, it is recommended for spraying and transfer jobs. The unit is self-priming and is made to deliver 12.5 gpm. The pump has ¾ in. pipe connections and can be mounted directly on a truck or

FOR YOUR CONVENIENCE

For your convenience in obtaining more information about any of this equipment, use this coupon.

Heating, Piping & Air Conditioning
6 N. Michigan Ave., Chicago 2, Ill.

[1-53]

Please ask the manufacturers to send me more information about equipment mentioned under these reference numbers in Equipment Developments.

(Circle each HPAC number in which you are interested)

1	2	3	4	5	6	7	8	9	10	11	12	13	14	15
16	17	18	19	20	21	22	23	24	25	26				

Name .... **Title** ....

Company ....

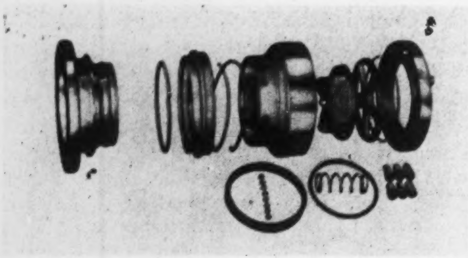
Address ....

City .... **Zone** .... **State** ....

tractor PTO shaft. [Manufacturer: Hypro Engineering, Inc., Dept. KP, 404 N. Washington Ave., Minneapolis 1.]

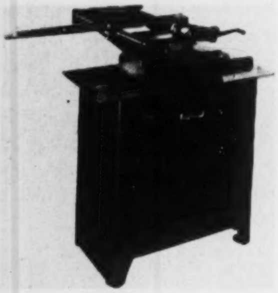
Coupler

HPAC 5—Quick connecting coupler designed so that connections can be made or broken by sliding a sleeve on the coupler. . . . Made with standard flanged connections, the valve in the coupler body automatically shuts off the liquid flow when the male part is removed. Couplers are made from ¼ in. to 8 in. and swivel 360 deg. [Manufacturer: Snap-Tite, Inc., Union City, Pa.]

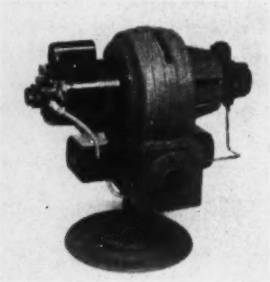


Slitting Attachment

HPAC 6—Sheet metal slitting attachment provides power shearing for metal of 20 gage or lighter. . . . It is designed to handle any length from 1 in. and on and hold a tolerance of 1/32 in. on an 8 ft sheet. It is equipped with a mechanically operated back gage, parallel to the shear line. According to the manufacturer, it will shear as little as ⅛ in. from a sheet, or the guide can be set as far back as 24 in. so that a slitting job can be handled on material as wide as 48 in. Re-sharpening is confined to two small rolls. [Manufacturer: The Lockformer Co., 4615 W. Roosevelt Rd., Chicago 50.]



Metal Slitter



Burner

Oil Burner

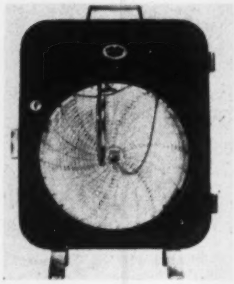
HPAC 7—Model N4G replaces model 4G. . . . New model has a capacity of 15-30 gal and a flange mounted ½ hp motor with overload switch and twin ignition consisting of two transformers. The backplate is made of pyrex glass and the entire burner is a one-piece machined housing. [Manufacturer: Radiant Utilities Corp., 8817 18th Ave., Brooklyn 14.]

Oil Mist Control

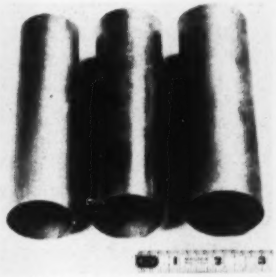
HPAC 8—Control unit for the salvage or recovery of coolant oil . . . . Redesigned "Precipitron" oil mist control unit is made to recover the coolant oil from the mist and smoke generated by high speed cutting, grinding, milling and similar machining operations. The fan motors are three-phase, fractional hp, ball bearing, prelubricated, totally enclosed, for 220 or 440 volt service. The power pack operates from a single phase, 115-volt line. It is shipped factory assembled and may be floor mounted or ceiling suspended. [Manufacturer: Westinghouse Sturtevant Div., Dept. T-509, 200 Readville St., Hyde Park, Boston 36.]

Recording Thermometer

HPAC 9—Recording thermometer for wall or flush mounting, portable use, and for single pen or double pen recording. . . . Movement has a micrometer adjustment and is actuated by a stainless steel spiral spring. Hand wound or electric chart drives can be furnished for 12-hour, 24-hour and 7-day revolution. Other periods of revolution for all standard ranges can also be furnished. [Manufacturer: Weksler Thermometer Corp., 49 W. 32nd St., New York 1.]



Thermometer



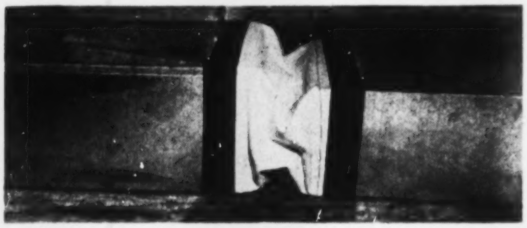
Tubing

Seamless Tubing

HPAC 10—Increase in size range of seamless light-wall tubing from 1¼ in. O.D. maximum to 2-1/16 in. O.D. maximum. . . . Applications for large diameter seamless tubing include bellows for industrial and aircraft instruments, flexible metal hose for the aircraft, food and chemical industries and low pressure heat exchanger tubes. The new tubing ranges in length from 5 to 22 ft in random, multiple or cut lengths. [Manufacturer: Superior Tube Co., 1575 Germantown Ave., Norristown, Pa.]

Pressure-Sensitive Tape

HPAC 11—"Scotch" Brand pressure-sensitive tape No. 472 for sealing duct sealing. . . . Used for both flexible and fixed ducts, it has a vinyl plastic backing coated on one side with a pressure-sensitive adhesive. According to the manufacturer, the tape eliminates the need for set screws, drill, wheat paste and asbestos paper. [Manufacturer: Minnesota Mining & Manufacturing Co., Tape Div., 900 Fauquier Ave., St. Paul 6.]



Window-Type Conditioner

HPAC 12—Window-type room air conditioner features single dial which controls entire operation. . . . The

Fume Removal
NO HEADACHE AT BAYER ASPIRIN PLANT

Photo courtesy of The Bayer Company Division of Sterling Drug, Inc.

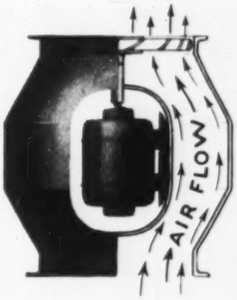
In designing the beautiful new Bayer pharmaceutical plant in Trenton, N. J., engineers had to choose the best method of exhausting fumes from the filters. Their prescription: 20 DeBothezat stainless steel Bifurcator Fans installed in ducts right above the filters. Each Bifurcator has a 16" fan wheel with 1/2 HP motor and exhausts 2450 CFM at 3/8" SP. This method of fume removal protects workmen and equipment and helps maintain the conditions of strict quality control under which Bayer Aspirin is produced.

Choice of Materials — Bifurcators can be constructed of cold rolled steel, stainless steel, rubber coated steel, monel metal and many other corrosion-resistant materials.

Many Sizes — Bifurcators are available in a wide range of sizes and capacities, delivering from 913 cubic feet of air per minute (12" diameter fan with 1/20 HP motor) up to 45,000 cubic feet of air per minute (48" diameter fan with 20 HP motor).

If you have a fume removal problem, investigate DeBothezat Bifurcators. Write or ask your DeBothezat representative for new illustrated catalog.

Here's How THE BIFURCATOR FAN WORKS . . .



The DeBothezat Bifurcator is a direct motor-driven fan with a divided housing. Corrosive fumes are by-passed around the motor, which is mounted in a separate chamber, open to atmosphere but isolated from exhaust fumes.

DeBothezat Fans

Division of American Machine and Metals, Inc.

EAST MOLINE, ILLINOIS

Here's why leading Consulting Engineers specify CFE CONTROLS

Closed and open view of CFE Damper Control for automatic sequence control of oil, gas and stoker-fired boilers. Designed for use with CFE indicating gages and "Lectricarm" drive unit.

CLEVELAND
DAMPER CONTROL
1
2
3

CFE Control Systems cut fuel costs, reduce smoke, soot and fly ash, prolong life of boiler equipment and increase boiler safety. Damper Control illustrated contains, in one compact cabinet, all elements for safe, automatic, electrical remote control, from overfire draft. Standard unit provides:

1. **Purge period before firing**
2. **Open damper until safe flame is established**
3. **Modulated damper holding desired draft during firing period**
4. **Closed damper at end of firing cycle for gas or oil, continued modulation for stokers**
5. **Special "fail-safe" features for complete protection in event of failure of any part of firing or control systems.**

Exclusive optional features of CFE systems

1. ***Integral Minimum Draft Switch*** with time delay to shut down firing when draft is below predetermined rate.
2. ***Adjustable Start Feature*** to provide partial opening of damper for purging boiler without extinguishing pilot. Especially helpful on induced draft installations.
3. ***Purge Period after Firing*** before damper closes. Designed particularly for induced draft systems.

"LECTRICARM"

Sensitive, remotely-controlled, mechanical automatic drive arm for operating dampers. Extra power overcomes binding or warped dampers.

For Assured Results, Specify CFE Instruments and Controls

The CFE line includes damper controls, steam controls, electronic smoke detector-control units, draft, air pressure and flue temperature gages.

Write for 12 page catalog and specification manual.

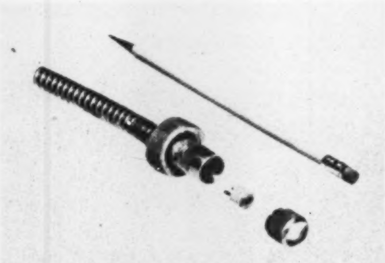
COMBUSTION INSTRUMENTS & CONTROLS FOR EFFICIENCY AND ECONOMY
CLEVELAND FUEL EQUIPMENT CO.

CLEVELAND FUEL EQUIPMENT COMPANY
7316 Associate Ave. • Cleveland 9, Ohio

grille through which the conditioned air flows into the room is in four sections, each of which enables the user to choose any directional flow or any combination. The filter is accessible through the return air vent and can be replaced without disturbing any other part of the unit. Thermostatic control is standard in the 1 hp model and optional in ¾ hp model. [Manufacturer: Servel Inc., 119 Morton Ave., Evansville 20, Ind.]

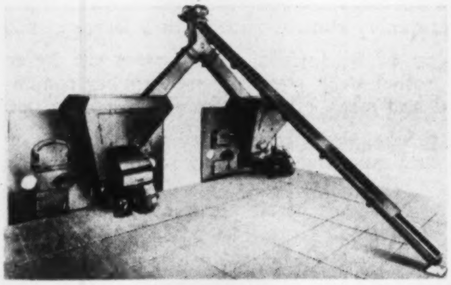
Flame Failure Safeguard

HPAC 13—Scanner type "48 PTI" provides flame failure protection for gas, oil, pulverized coal or combination fuel burner installations. . . . The eye of the scanner, "Firetron," is a photoconductive cell responsive to infrared. The eye plus electronic circuits distinguish between the infrared of a flame and that of other sources. The cell is plugged into the scanner units which consists of a mounting for the cell and a length of cable for electrical connections. The single scanner views both the pilot and main flames and provides instant burner shutdown in the event of failure. [Manufacturer: Combustion Control Corp., 720 Beacon St., Boston 15.]



Stoker Screw Feed

HPAC 14—Screw feed in coal stokers has been adapted as a large scale automatic conveyor. . . . Called "Flo-Tubes," the cast iron trough is bolted together in sections, capped with steel plates removable for inspections, and inserted in the bottom of bin or pile with end left exposed for pick up. High or low levels in hoppers are maintained by switches automatically starting and stopping the screw feed. Range of sizes offered convey up to 10,000 lb of coal per hr. [Manufacturer: Canton Stoker Corp., 407 Andrew Pl., S. W., Canton 1, Ohio.]



Flame-Resistant Curtains

HPAC 15—Flame-resistance canvas curtains and blankets that can be hung to form booths to screen off dangerous operations. . . . The cloth affords protection for workers near arc welding and other operations where arc flash, molten splash, flying chips, scale, etc., are produced. They are made in sizes to more than 100 sq ft.

Therm-O-Tile

REG. U.S. PAT. OFF.

THE PERMANENT CONDUIT FOR

UNDERGROUND STEAM LINES

When you install THERM-O-TILE You Get:

1—Higher Efficiency. Much better insulation. A truly DRY conduit — always.

2—Greater strength. Arched construction. A permanent "spread-footing" foundation.

3—Longer life. The correct grade is maintained permanently. No settling or sagging.

4—No leakage. Positive sealing throughout.

5—Most convenient for installation work — on a concrete "sidewalk".

6—No condensation pockets at any time.

7—Greater economy for all time.

8—Experienced engineering cooperation.

9—Competitive first cost and definitely lower ultimate cost.

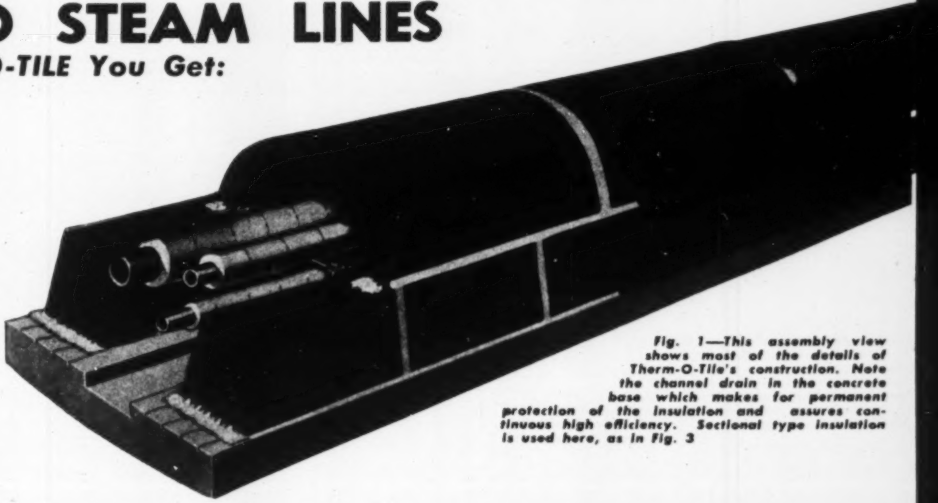


Fig. 1—This assembly view shows most of the details of Therm-O-Tile's construction. Note the channel drain in the concrete base which makes for permanent protection of the insulation and assures continuous high efficiency. Sectional type insulation is used here, as in Fig. 3

Fig. 2—The photograph below shows a filler type insulation job, protected by Therm-O-Tile Conduit.

TYPICAL INSTALLATIONS

Academies
Airplane Factories
Airports
Ammunition Depots
Arsenals
Automotive Factories
Central Heating Plants
Chemical Plants
City Farms
Colleges
Conservatories
Cotton Mills
Court Houses
Experiment Stations
Factories
Forts
Garages
Gas Plants
Govt. Laboratories
Govt. Schools
Govt. Shops
Greenhouses
Hospitals, all kinds
Housing Projects
(Therm-O-Tile was used in the first Federal Project.)
Infirmaries
Medical Centers
Military Bases
Museums
Naval Stations
Office Buildings
Ordnance Plants
Orphan Homes
Penitentiaries
Power Stations
Prison Farms
Proving Grounds
Rayon Mills
Reformatories
Research Laboratories
Rubber Factories
Sanitariums
Schools
Sewage Plants
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State Capitols
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Universities
Woolen Mills
Etc.

Ask for Bulletin

For complete data, specifications, and photos of installations, ask for Bulletin 511.

Johns-Manville - Therm-O-Tile is represented by Johns-Manville Technical Service Units in all principal cities.

H. W. PORTER & CO., INC.
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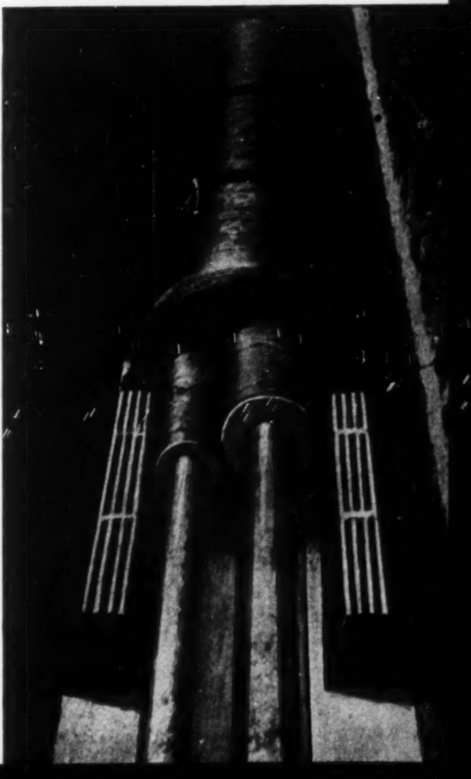
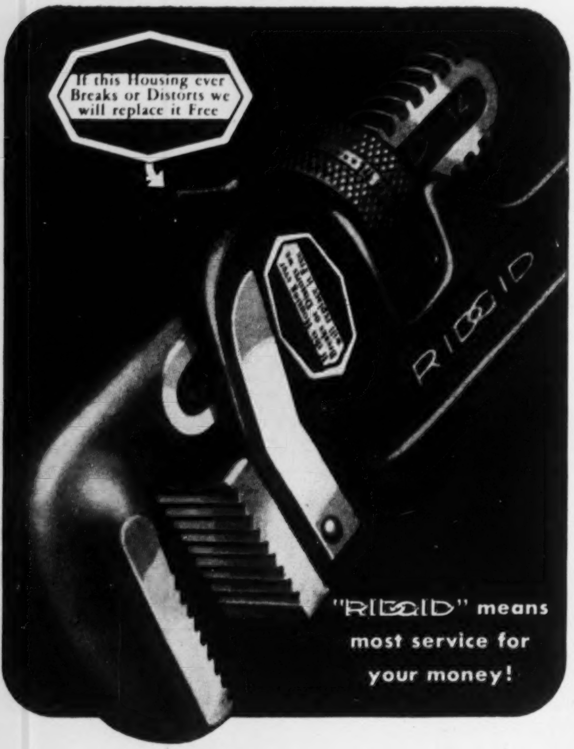
Insulation Engineers & Contractors

Fig. 3—The photograph below shows a sectional type insulation job, protected by Therm-O-Tile Conduit.




If this Housing ever Breaks or Distorts we will replace it Free
RIDGID
"RIDGID" means most service for your money!

Only Genuine

RIDGID

PIPE WRENCHES

Guarantee you against wrench housing trouble and expense

Look for the wrench with that guarantee label to make sure you get the extra-easy work and extra durability that have made RIDGID the world's most popular wrench.

Only RIDGID assures you a hookjaw that always rides freely in the housing; adjusting nut always spins easily to pipe size. Replaceable alloy jaws won't slip or lock on pipe. Handy pipe scale on hookjaw. Safe stout comfort-grip I-beam handle.

Save work and money—buy genuine RIDGIDs at your Supply House.

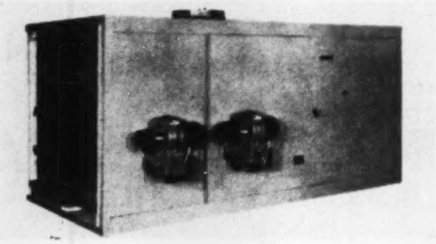
THE RIDGE TOOL COMPANY, ELYRIA, OHIO

RIDGID
Work-Saver Pipe Tools

[Manufacturer: Eastern Equipment Co., Inc., Willow Grove, Pa.]

Suspension Furnace

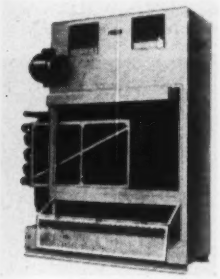
HPAC 16—Warm air suspension furnace, "01-1250-S-100," designed to be capable of producing 1,000,000 Btu at bonnet and handling 12,500 cfm of tempered air. . . . Twin burners, electronically controlled with electric eye protection, fire into separate combustion chambers at the rate of 4½ gph. Four rectangular tubes carry the air around flue passages. A 25 in. blower and 5 hp, 1,750 rpm motor are used. Panel liners are provided to keep outside cabinet temperatures low. [Manufacturer: Jackson & Church Co., 321 N. Hamilton Ave., Saginaw 65, Mich.]



Matching Hoists

HPAC 17—Matching hoists in ¾, 1⅛ and 1½ ton sizes. . . . Cable lengths range from 10 ft on the large to 25 ft on the smallest. All hoists have 133 strand preformed aircraft cable, stainless steel springs, oilite type bearings and an open construction which, according to the manufacturer, is self cleaning in sand, mud or ice. Other features included are a reversing arrangement and a handle which bends to prevent overloading. [Manufacturer: The Lug-All Co., 331 E. Lancaster Ave., Wynnewood, Pa.]

Hoist


Condenser

Evaporative Condensers

HPAC 18—Evaporative condenser featuring flexibility of arrangement and accessibility. . . . It is of building block construction and has removable sectional components. Offered in six sizes with capacities from 7½ to 40 tons, it is hot-dipped galvanized after fabrication. Shipped ready for use, the equipment can be readily disassembled in the field and reset in any of 16 different arrangements to meet specific installation requirements. [Manufacturer: United States Air Conditioning Corp., 3300 Como Ave., S.E., Minneapolis 14.]

Room Air Conditioner

HPAC 19—Addition of 1/3 and ¾ hp models to room

Engineers, like you, prefer

CAPILATOR*

– the Wolverine capillary tube used for restriction purposes

because it is PLUG DRAWN

Through the special Wolverine process of plug-drawing this tiny tube a smooth, glass-like finish is imparted to the inside wall. This exceptionally fine surface assures a uniform and uninterrupted flow of liquids and gases through the tube.

The Capilator is one of Wolverine's products developed to render controls more dependable and bring higher operating efficiency to the products you manufacture.

WOLVERINE TUBE DIVISION

of Calumet & Hecla, Inc.

Manufacturers of tubing exclusively

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*REG. U. S. PAT. OFF.

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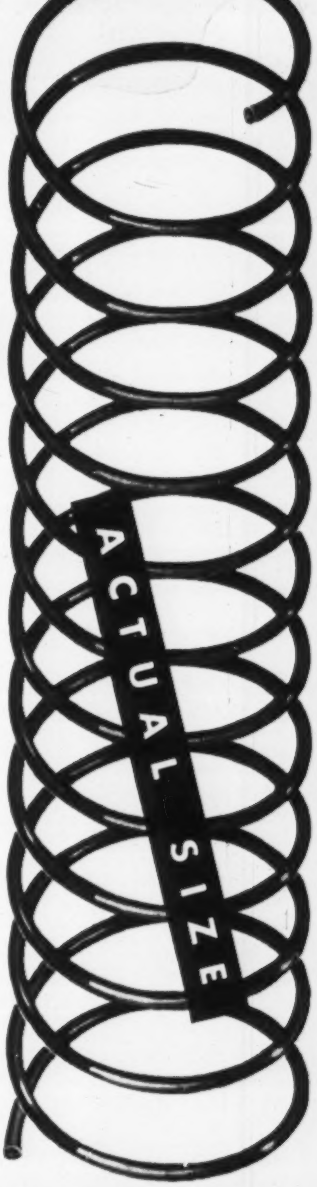
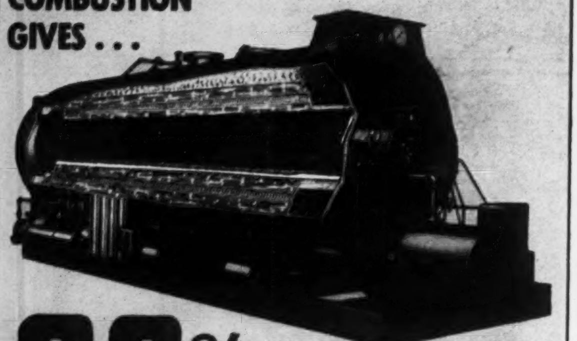


ONLY CYCLONIC COMBUSTION GIVES . . .



66% MORE POWER
per sq. ft. of heating surface

By reducing heating surface requirements from 5 to just 3 sq. ft. per B.H.P., Cyclonic Combustion produces 66% more power per sq. ft.—saves up to ⅓ the space of conventional package steam generators. Cyclonic Combustion is the revolutionary new flame control used exclusively in Cyclotherm steam generators. Flame characteristics are controlled in a revolving spiral vortex traveling the full length of the furnace to insure maximum heat transfer without direct flame impingements or hot spots. The cyclonic action of the flame accounts for a 65 to 75% heat transfer within the main fire-tube. This high rate of heat transfer enables Cyclotherm 2 pass generators to maintain a guaranteed minimum efficiency of 80% for any steam requirement.

Cyclotherm steam generators with patented Cyclonic Combustion offer these additional features: Full power operation from a cold start in 15 to 20 minutes; Savings up to 50% on maintenance; Greater fuel savings; Boilers designed for oil or gas operation from 18 to 500 h.p., 15 to 200 psi operation pressure.

Proved superior in thousands of installations, Cyclotherm steam generators with new Cyclonic Combustion offer the most efficient and compact package steam generator on the market today. Find out more about Cyclotherm and Cyclonic Combustion—write today for a free illustrated folder.

The Cyclotherm meets all state requirements and is built in accordance with A.S.M.E. and National Board Standards and bears the label of Underwriters Laboratories, Inc.

CYCLOTHERM
STEAM GENERATORS

Cyclotherm Division U. S. Radiator Corp.
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Please send without obligation my copy of "All Your Questions Are Answered by Cyclotherm."

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air conditioner line. . . . Controls are located on top of the unit with 4-way adjustable louvers and vanes at the top front to direct air to any part of the room. Units are powered by the "Meter-Miser" compressor used in the company's household refrigerators. The blower-fan can be operated separately to provide air circulation only. One model has one Meter-Miser and another model has two refrigeration systems. [Manufacturer: Frigidaire Div., General Motors Corp., Dayton 1.]

Electric Unit Heaters

HPAC 20—Electric heating elements for the company's unit heaters where steam, hot water or gas is not available. . . . Three models, revolving and fixed vertical discharge and horizontal discharge, are equipped with "L.P. Hynes" heating element. The elements have an arrangement of flexibly mounted insulators designed for service up to 600 volts. The electric heaters are made to deliver from 13,600 to 204,000 Btu's per hr. [Manufacturer: L. J. Wing Mfg. Co., Vreeland Mills Rd., Linden, N. J.]

Controller for Solenoid Valves

HPAC 21—Electric contact controller for solenoid valves, warning signals and motors. . . . Vapor actuated, the controller is designed to stand a fairly heavy electrical load. A special feature is a red and green pilot light to show the position of the switch. Controllers operate on 115 volts a.c. but can be furnished for currents up to 250 volts a.c. or d.c. [Manufacturer: H. O. Trerice Co., 1420 W. Lafayette Blvd., Detroit 16.]

Temperature Indicator

HPAC 22—Instrument covers in six overlapping ranges the span from 15 deg F to 120 deg F. . . . It is indicated for synoptic meterology, heating and ventilating, laboratory research and process checking. Indicating meter with battery case is mounted on a clipboard and connected to the sensing element by cable. [Manufacturer: Beckman & Whitley Inc., 1002 San Carlos Avenue, San Carlos, Calif.]

Improved Sewage Ejector

HPAC 23—"Submersible Sewage Ejector" now is available in a 4 in. discharge with horsepower ratings of 1½, 2 and 3. . . . Capacities run from 50 gpm to 300 gpm and heads from 20 to 45 ft. The unit is designed to be installed in sumps of any depth within the limits of the discharge head requirements. [Manufacturer: Weil Pump Co., 1530 N. Fremont St., Chicago 27.]

All Season Air Conditioners

HPAC 24—Window and cabinet air conditioners which adjust automatically to room temperatures changes. . . . Refrigerating mechanism is controlled by a thermostat, adjustable to any of six settings by means of a plastic dial on the front base of the unit. A ventilating fan continues to circulate room air after the mechanism has been cut off. Three circular, louvered vents can be rotated independently to channel air flow in any direction. The units dehumidify the air as they cool it, filter out most dust and dirt from the air and reduce air-borne pollen, according to the manufacturer. A dial controls a damper for the admission of fresh air so that the unit may be

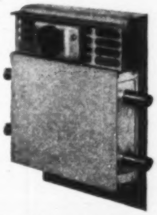
"IF IT'S
KRITZER
IT'S RIGHT, SIR!"

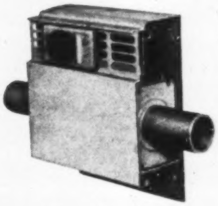
FOR NEW CONSTRUCTION OR REMODELING — THE FINEST FIN-PIPE RADIATION IS KRITZER

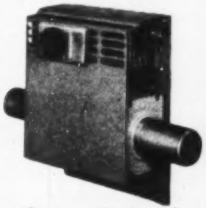
NOTE: [illegible] *I. H. & V. Exposition, International Amphitheatre, Chicago, January 26-30, 1953.*

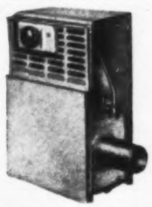
KRITZER BASEBOARD HEATING

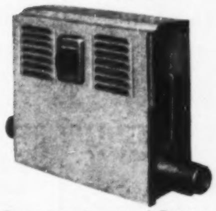
KRITZER—the finest, most complete Baseboard line on the market today—includes five separate types to meet every heating need. New design features make installation faster, easier, insure maximum operating efficiency; and provide the most attractive finished appearance. Damper and positive action control available. Full line of accessories includes joint covers, corners and end enclosures, with access panels if desired.


Standard Baseboard


Universal Baseboard


Economy Baseboard

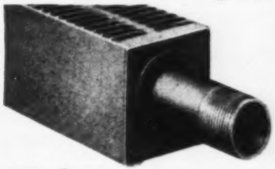

Convector, Slotted Front

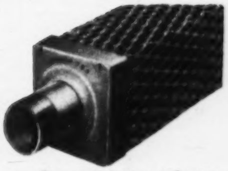

C nvector, Louvered Front

KRITZER FIN-PIPE COILS

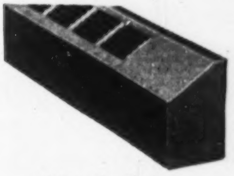
These rugged, heavy-duty elements are ideal for industrial, commercial and institutional steam or hot water heating. Made with steel pipe or copper tube—steel, copper or aluminum fins. Standard fin spacings 24, 32 or 48 per foot; others by request. Complete line of covers and accessories available for the perfect finishing touch to any installation.

Kritzer Fin-Pipe Coil


Utility Cover


Expanded Metal Cover

Flat Top Cover


Slope Top Cover

Kritzer fin-tube coils in final position between joists before ceiling is finished

KRITZER RADIANT COILS

Simple in construction and easily installed, these coils provide today's most efficient method of radiant panel heating. A combination of copper tube and aluminum fins they are concealed but not imbedded in structural materials. Enclosed in joist or stud spaces Kritzer Radiant Coils indirectly warm ceilings, floors or walls, wherever radiant panels are desired.

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KRITZER RADIANT COILS, Inc.

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traps help uncover hidden steam treasure

TRY A TRAP—FREE!

The facts are these:

A large southern chemical company about a year ago was up to capacity on their boilers. New process units were being added, requiring more steam—a new boiler seemed inevitable.

About that time they began replacing their old-type traps and bleed-off valves with Yarway Impulse Steam Traps and Strainers. Today, even with the new process units added, their daily steam consumption is nearly 100,000 lbs less than a year ago—the superintendent gives Yarway Impulse Traps credit for the saving.

Yarway Impulse Traps are *designed* to insure sending the most premium B.T.U.'s at top temperature into your product or process . . . *to get equipment hotter sooner and keep it hot!*

Yarway's have 11 other advantages, too—such as *small size, low maintenance, low cost, and availability* from over 200 Industrial Distributors.
Write for Bulletin T-1740. Or for steam trap advice, call on your nearby Yarway service engineer.

YARNALL-WARING COMPANY
107 Mermaid Avenue, Philadelphia 18, Pa.

the steam trap designed with more production in mind

used when room cooling is not necessary. [Manufacturer: General Electric Co., Major Appliance Div., 210 W. Liberty St., Louisville 2.]

Flow Meter

HPAC 25—"Flo-Watch Model AFUAQ" for metering flow of liquids, steam, air and gas. . . . The meter measures the flow through standard differential producers such as venturi tubes, nozzles and orifices. Also it is designed for use with Kennison open nozzles, flumes and weirs. According to the manufacturer, this instrument is adaptable for any combination of totalizing, indicating or recording functions. A totalizing model with transmitter attachment can actuate a secondary instrument or can control a chemical feeder remotely located. A summation meter also may be operated from transmitting attachments in several individual instruments. [Manufacturer: Builders-Providence, Inc., 345 Harris Ave., Providence.]

Air Control

HPAC 26—"Scoopmaster," a device to deflect and control the air from a supply duct into a collar. . . . It is a combination of the company's "Scooptrol" and "DH Outlet." The scoop portion is attached to and pivots on one end of the outlet. A screw-type mechanism on the end opposite the pivot permits in and out adjustment. By means of the screw-type mechanism the scoop portion is extended back into the duct, or brought closer to the face of the outlet. The new model was designed to eliminate the sheet metal collar on exposed ductwork, to speed up balancing of the system and to obtain directional control of the air. According to the manufacturer, all adjustments can be made from the room without removing the outlet from the duct. An intermediate set of fins may be set so that the air may be directed to give equal, right or left distribution or a combination. [Manufacturer: Stewart Mfg. Co., Inc., Grove Ave., Cedar Grove, N.J.]

EQUIPMENT BRIEFS . . . .

BERYLLIUM COPPER STRIP, custom-rolled in strips up to 6 in. wide and down to .0005 in. thin with tolerances as close as ± .0001 in. Strip is available in any quantity from 1 lb to thousands of pounds. [Manufacturer: American Silver Co., Inc., 36-07 Prince St., Flushing 54, N. Y.]

OIL ADDITIVE for refrigeration designed to provide higher standards in Btu efficiency and prevent the formation of carbon and sludge deposits on bearing surfaces. Known as " Addit 88," the manufacturer states that it will remain in the refrigeration system for the life of the unit and acts as a lubricant for the moving parts. [Manufacturer: Sealed Unit Parts Co., Inc., 261 E. 161st St., New York 51.]

"Audigage" *ULTRASONIC MICROMETER* for precise thickness measurement on homogeneous materials such as steel, brass, and other substances capable of transmitting the ultrasonic waves generated by a vibrating crystal. [Manufacturer: Branson Instruments, Inc., 430 Fairfield Ave., Stamford, Conn.]

Hit of the Show!

Booths 1237 • 1239 • 1243
INTERNATIONAL HEATING
& VENTILATING SHOW
Jan. 26-30
International Amphitheater
Chicago

a completely new idea for COOLING from

Mueller Climatrol

Everywhere it's been shown, this new Mueller Climatrol idea for home cooling has been a big hit! Newest element of the star-studded Mueller line for 1953, it's especially designed for cooling low-cost homes and *homes with radiator heat.*

Be sure you visit our exhibit at the International Heating and Ventilating Show in Chicago.

See too, the many other Mueller Climatrol units designed for greater dealer profits . . . highboys, counter-flows, attic furnaces, compact gas boilers, and self-contained cooling for complete year 'round systems.

ALSO ON EXHIBIT!

Type 116-216 Winter Air Conditioner
Brand new, compact — only 45″ high, 24½″ wide, 61½″ long. Easy to install. Controls fully enclosed. Unit is shipped assembled in two pieces for easy handling. Will go through any ordinary door, down any winding stairs. It is pre-wired and has Mueller Climatrol designed convertibility — it can be converted from oil to gas at little cost. Sizes up to 150,000 Btu input.

Type 903 Air Conditioner
Self-contained. Available in four sizes—2, 3, 5 and 7½ tons. This unit is designed to provide efficient dependable cooling and can be installed with any forced air furnace. Since the type 903 is a completely self-contained unit it can be installed with a minimum of time and trouble.

If you aren't going to make the show to examine Mueller's new cooling unit, the next best thing is to use the attached coupon. We'll send you descriptive literature just as soon as it's off the press.

L. J. MUELLER FURNACE COMPANY
2023A W. Oklahoma Avenue, Milwaukee, Wisconsin

Please send me free descriptive bulletin on Mueller's new cooling unit.

Name..............................
Company Name..............................
Company Address..............................
City..............................(.........) State..............................

ALADDIN
FANS

Type "EX"
INDUSTRIAL
EXHAUSTERS

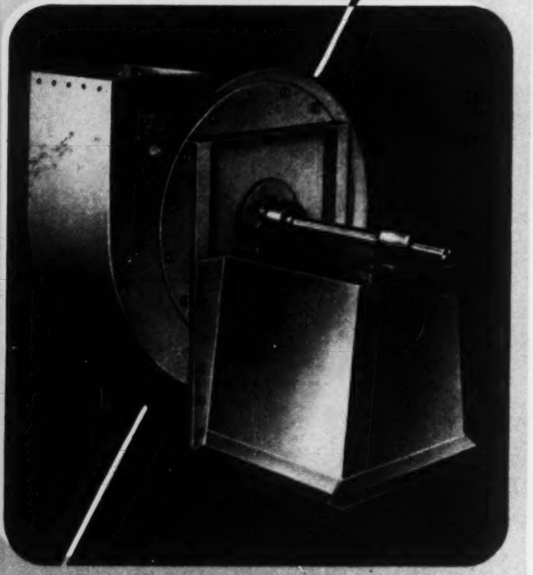
- RUGGED
- EFFICIENT
- DEPENDABLE

ALADDIN Industrial Exhaust Fans are ruggedly built and are especially suited for material handling or fume exhaust applications. They are ideal for removing dust from grinding wheels, conveying materials such as grains, shavings, sawdust, or the removing or handling of fumes, hot air or gases.

Units are all-welded steel plate construction ... and are available with interchangeable "AR" Air Rotors, "MR" Material Rotors or "OR" Open Rotors.

WRITE FOR COMPLETE DATA

ALADDIN HEATING CORPORATION
2272 SAN PABLO AVE., OAKLAND 12, CALIFORNIA
REPRESENTATIVES IN ALL PRINCIPAL CITIES IN THE WEST



WE HEAR THAT . . .

Production has begun at the *ALUMINUM COMPANY OF AMERICA'S ROCKDALE WORKS.* The new smelting plant in Texas, when completed late in 1953, will include four potlines in which aluminum will be produced from refined aluminum ore, a plant for the manufacture of carbon electrodes required in the electrolytic aluminum producing process, a power plant for the generation of required electricity and facilities for mining lignite. The new plant, which will have a capacity to produce about 170 million lb of aluminum annually, will be the first aluminum smelting plant in the nation to use electric power generated by burning lignite. *J. D. HARPER* is manager of the Rockdale Works.

Basic reasons for not interchanging refrigerants in a typical cooling system were explained graphically in an exhibit by the *DU PONT COMPANY'S "KINETIC" CHEMICALS DIV.* at the 10th Educational Conference of the Refrigeration Service Engineers' Society in Miami, early in December. Chemical and physical differences of two of the fluorinated hydrocarbon refrigerants, "Freon-12" and "Freon-22", were featured.

The "Kinetic" Chemicals Div. also is sponsoring a campaign to help refrigeration servicemen level out winter slumps in maintenance work by telling their customers of the advantages of slack season check-ups of their equipment. Known as the "Preventive Maintenance" program, it offers the serviceman, through wholesalers of refrigeration equipment, a complete direct mail package.

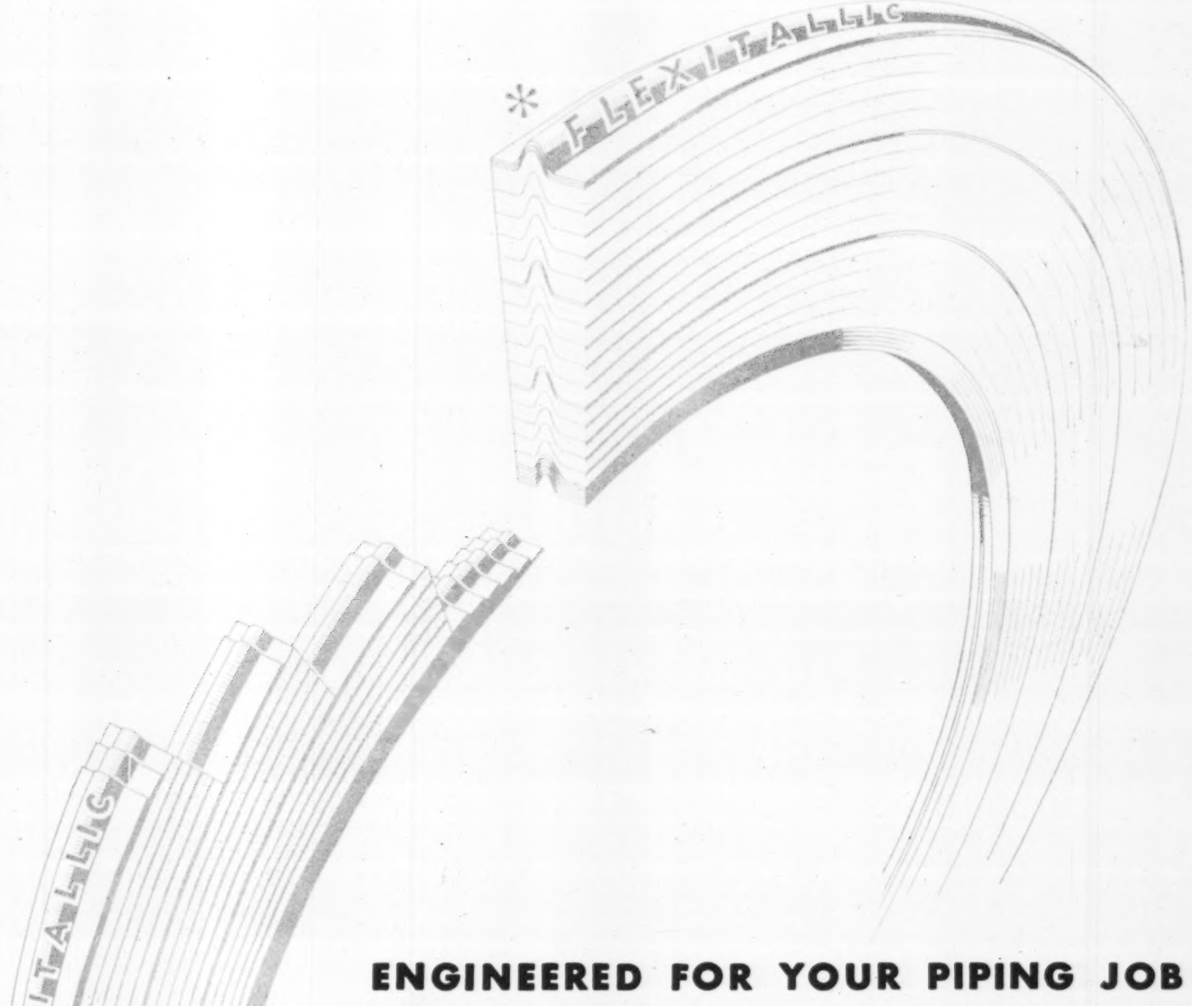
Two companies, the *KEWANEE-ROSS CORP.* and *IRON FIREMAN MFG. CO.*, have joined forces to develop and market the new "Kewanee-Iron Fireman Boiler-Burner Unit." The collaboration is without financial or corporate connection. The burner portion of each unit is completely assembled and tested at the Iron Fireman Cleveland plant. The boiler portion is assembled at Kewanee and both are shipped direct to the installation site. Matching connections are provided so that the two portions can be quickly combined to form the complete unit.

NIELSEN HYDRAULIC EQUIPMENT, INC. of New York has been appointed an authorized distributor for industrial tube fittings and tube working tools manufactured by the Parker Appliance Co.

As a sales aid for distributors of its products, the *WESTINGHOUSE AIR CONDITIONING DIV.* is conducting an Application Engineering School in 10 cities throughout the country. Conducted by a headquarters team, the three-day course covers all facets of air conditioning from system design to equipment selection.

New factory facilities for the assembly of control valves were recently acquired by the *FOXBORO CO.* at its Dallas branch. The new quarters practically double the area de-

[*Continued on page* 337]



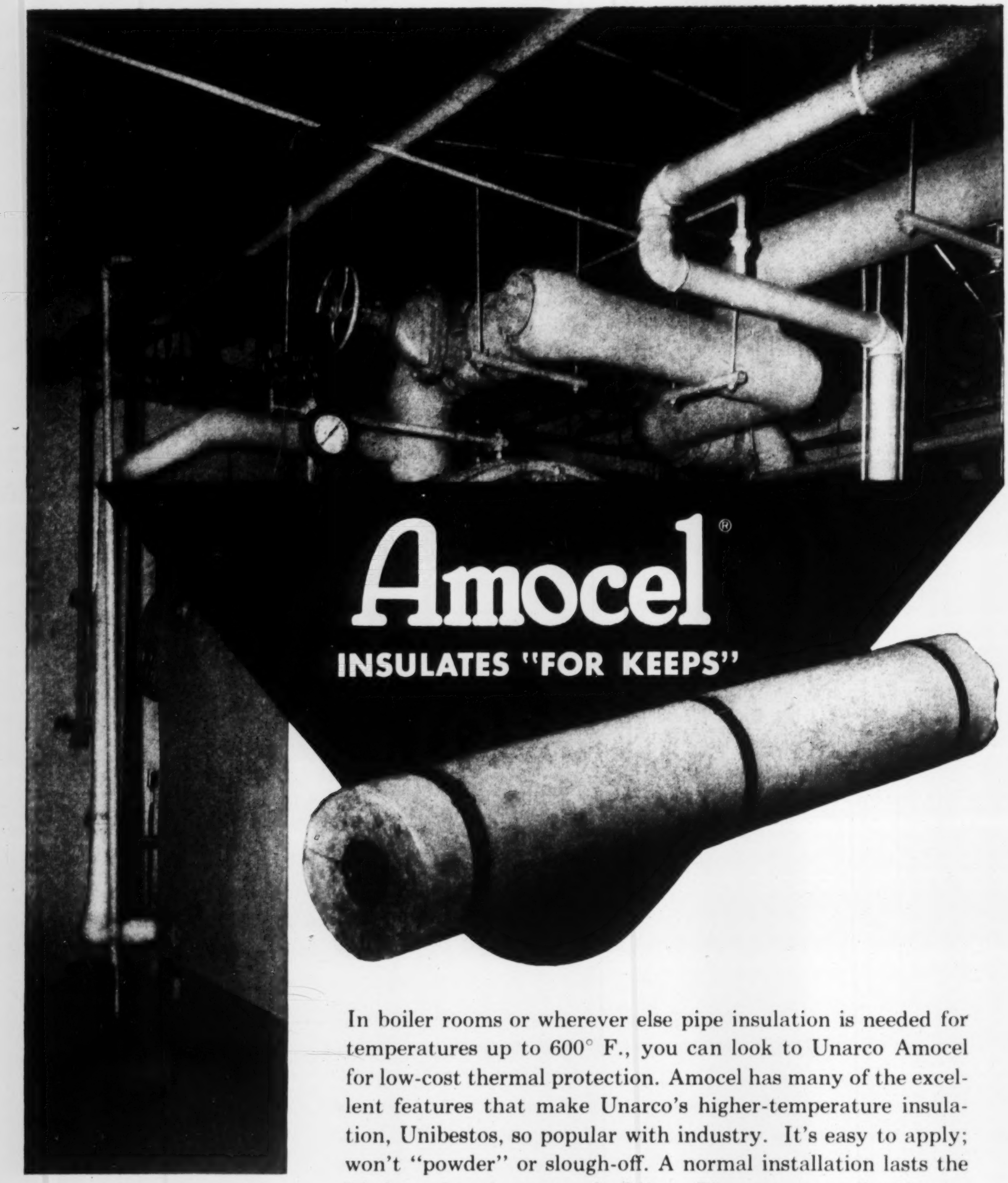
ENGINEERED FOR YOUR PIPING JOB

Two engineers—working together—are responsible for every industrial piping application that uses Flexitallic Spiral-Wound Gaskets. One is the engineer-in-charge. The other is the Flexitallic Gasket design engineer. Working together, they build a gasket for *your* piping installation . . . to *your* specifications. Each Flexitallic Gasket is engineered to specific conditions of thermal and physical shock, corrosion, or unusual joint stress by spiral-wound V-crimped plies of the required metal with alternating plies of the proper filler. This results in a resilient gasket having characteristics of a calibrated spring. Flexitallic Gaskets are at highest efficiency when bolted up cold at predetermined load. For all pressure/temperature ranges from vacuum to 4000 lbs., from extreme sub-zero to 2000 F. For all flange series from 150 to 2,500 lbs. For all standard joint assemblies. In four thicknesses for special requirements: .125", .175", .250", .285". With Teflon filler for corrosive chemical conditions. Write us your requirements . . . Flexitallic Gasket Company, 8th & Bailey Streets, Camden 2, New Jersey. Representatives in principal cities. Consult your Classified Telephone Directory.

40th ANNIVERSARY Flexitallic®
SPIRAL-WOUND GASKETS

FOR PIPE FLANGES, PRESSURE VESSELS AND PROCESS EQUIPMENT

*Not all spiral wound gaskets are Flexitallic. Look for the name FLEXITALLIC stamped into the metal of spiral-wound [illegible] Flexitallic Gaskets. Look for *Flexitallic Blue* in gaskets with asbestos filler,



In boiler rooms or wherever else pipe insulation is needed for temperatures up to 600° F., you can look to Unarco Amocel for low-cost thermal protection. Amocel has many of the excellent features that make Unarco's higher-temperature insulation, Unibestos, so popular with industry. It's easy to apply; won't "powder" or slough-off. A normal installation lasts the lifetime of equipment or building. Phone your nearby Unarco Warehousing Distributor for Amocel from stock. Or write us for your Distributor's name and free copy of Bulletin 76-109.

UNARCO

UNION ASBESTOS & RUBBER COMPANY

DEPT. A-1, 332 SOUTH MICHIGAN AVENUE • CHICAGO 4, ILLINOIS

Here's Something to Remember!

. . . if you plan to attend the

11TH INTERNATIONAL HEATING & VENTILATING EXPOSITION

Chicago • January 26-30

You're Invited

to meet your friends at the
Union Asbestos & Rubber Company
suite in the

CONRAD HILTON HOTEL

Drop in anytime. Stay as long as you wish. And, if you want to talk "insulations," you even can do that, too. There are many things "cooking" today at Unarco—things that you should know about.

UNARCO

UNION ASBESTOS & RUBBER COMPANY

332 South Michigan Avenue • Chicago 4, Illinois

[*Continued from page 334*]

voted to valve assembly and warehousing and will facilitate delivery and service to industries in the South and Southwest.

Schedules for industrial instruments maintenance and repair courses for the first half of 1953 have been announced by the Industrial Div. of *MINNEAPOLIS-HONEYWELL REGULATOR CO.* According to *MARTIN J. LADDEN*, chief instructor of the Philadelphia training school, the coming regular five-weeks courses will start February 16, March 30, May 11 and June 8. The 14-weeks comprehensive class will be held from February 16 to May 22.

Two hundred and fifty top salesmen of the *FEDDERS-QUIGAN CORP.* recently enjoyed a holiday in Nassau as a result of their efforts in the company's sales campaign. The salesmen and their wives spent four days at the Fort Montagu Beach Hotel.

The sales offices in Newark of the *RELIANCE ELECTRIC & ENGINEERING CO.* have been moved to new and larger quarters at 535 High St. Sales engineers headquartered at the new offices are *F. RAYMOND OBENCHAIN* and *JOHN H. STEVENS*.

TUTHILL PUMP CO. of Chicago and *INGERSOLL MACHINE & TOOL CO. LTD.*, of Ingersoll, Canada have reached an agreement whereby Ingersoll will manufacture and distribute the Tuthill "Fuelstat" for Canadian trade. Ingersoll also will distribute the general line of Tuthill industrial pumps.

At a recent meeting of the *NATIONAL ASSOCIATION OF ALUMINUM DISTRIBUTORS*, *DAVID P. REYNOLDS* said that when plants now under construction are completed, the nation's capacity for the production of aluminum will be nearly 10 times that available at the start of World War II. Mr. Reynolds, vice president in charge of sales of the Reynolds Metals Co. also pointed out that aluminum now is second only to steel in actual volume used each year.

Plans for a proposed major addition to *ALUMINUM ORE COMPANY'S* new alumina works at Bauxite, Ore. have been announced by President *ALLEN B. WILLIAMS*. The new facilities would be for manufacture of finished chemical products from alumina processed from bauxite mines in Arkansas.

MINNEAPOLIS-HONEYWELL REGULATOR CO. is planning to construct a two-floor addition to the main plant that will add 59,000 sq ft of floor space. The building houses extensive manufacturing operations and the company's executive and administrative offices. Company officials estimate the cost of the new addition will be approximately $900,000.

THE DEERING AIR-CONDITIONING CO. has acquired the former Sterling Cut Glass Co. building located

When water is a
Headache...
-use a

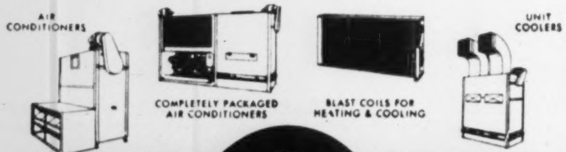
GOVERNAIR EVAPORATIVE CONDENSER

Water supply for air conditioning *can* cause you a lot of trouble. When there's a shortage; when rates are expensive or when sewage and piping are impractical—*water becomes a real headache!*

That's when engineers and contractors alike turn to Governair Evaporative Condensers!

Governair Evaporative Condensers eliminate waste-water disposal problems and pumping costs. And they're engineered to give maximum efficiency and performance at a reasonable cost. Available in sizes from 3 to 100 tons.

Choose a Governair Evaporative Condenser and there's no need for aspirin! GOVERNAIR CORPORATION, 513 N. BLACKWELDER, OKLAHOMA CITY, OKLA.


AIR CONDITIONERS
COMPLETELY PACKAGED AIR CONDITIONERS
BLAST COILS FOR HEATING & COOLING
UNIT COOLERS

GOVERNAIR

ORIGINATORS OF COMPLETELY PACKAGED AIR CONDITIONERS

on Mt. Adams, Cincinnati. The building contains approximately 40,000 sq ft of manufacturing, assembling and storage space on two levels and about 1500 sq ft of wood-paneled offices. Building alterations will step up production to 300 units per day.

THE ROBERT BARCLAY CO. of Chicago recently sponsored a service session where more than 225 servicemen listened to talks on the best methods of installing, servicing and maintaining fuel units. Speaker was *B. L. DOUGLASS*, service manager, Fuel Unit Div., Sundstrand Machine Tool Co. Mr. Douglass is presenting these service talks throughout the country.

AMERICAN WHEELABRATOR & EQUIPMENT CORP. has moved its district office in New York to 53 Newark St. Bldg., Hoboken, N. J. The change was made to provide better service to customers in Pennsylvania, New York, Connecticut and New Jersey served by this office. Sales engineers *DAVID LOGAN, K. E. BLESSING* and *F. J. PICHARD* are assigned to the district.

Twenty-three employees of the *TUBULAR PRODUCTS DIV.* of The Babcock & Wilcox Co. received pins for 20 years or more of continuous service at a dinner recently. The dinner was held to honor the veteran employee group which now numbers 452 with more than 20 years of service.

A giant illuminated sign has been erected by *WORTHINGTON CORP.* at its Harrison, N.J. plant, replacing one famous to travelers for 33 years. The new sign has 1,000 10-watt bulbs on seven-foot high red letters spelling out the corporation's name. Underneath, 500 ft of Neon in four colors outline the winged disc symbol.

The ARDUN SUPPLY CO., Tulsa, Okla., now is a distributor of industrial tube fittings and tube fabricating tools manufactured by the Parker Appliance Co.

MINNEAPOLIS-HONEYWELL REGULATOR CO. will open a new plant in Minneapolis in the near future for expanded defense production. A 38,000 sq ft building has been leased.

GLASS FIBERS INC. has joined the Industrial Mineral Fiber Institute. The company is the eighteenth member of this international association.

An award of merit has been presented to the *COMPRESSED AIR AND GAS INSTITUTE* by the American Trade Association Executives of Washington, D. C. The Institute is a trade association of manufacturers of industrial air and gas compressors and compressed-air-powered tools and rock drills.

A new color motion picture has been produced by the *KAISER ALUMINUM & CHEMICAL CORP.* showing the aluminum process from the mine to the fabrication into consumer products. The 16 mm. sound film is available from a number of the company's district offices.

THE INSUL-MASTIC CORP. OF AMERICA recently signed contracts with three coating applicator firms to represent it in the South. The three companies are: *INDUSTRIAL INSULATORS, INC.*, of Borger, Texas; *OZARK INSULATION CO.*, of Little Rock, Ark., and *RUST-ROOFING, INC.* of Phoenix.

Electrical engineering students at *CASE INSTITUTE OF TECHNOLOGY* in Cleveland now are taking a new motor design course where their own design effort will actually be incorporated into manufactured motors. Under the new plan, small groups of students will work together in designing motors from 1 to 7½ hp. Their specifications will then be sent to *ROBBINS & MYERS, INC.* where the motors will be built at no charge. The company then will send the motors back to Case so that students may check their work by making actual tests.

HAJOCA CORP., distributors of heating and plumbing, industrial and refrigeration supplies, recently had a formal opening of a new showroom at their Columbus, Ga. plant. A reception was given for 500 guests including officials from the Philadelphia general offices.

A completely redesigned and restyled line of room air conditioners with automatic controls was introduced to distributors by *FEDDERS-QUIGAN CORP.* at a recent national sales meeting. Emphasizing the need for room air conditioners in more than 40 million homes, *PRES. SALVATORE GIORDANO* said that the industry will not be able to meet the consumer demand despite major production increases in 1953. He cited as limiting factors the unavailability of some basic materials and essential manufactured components.

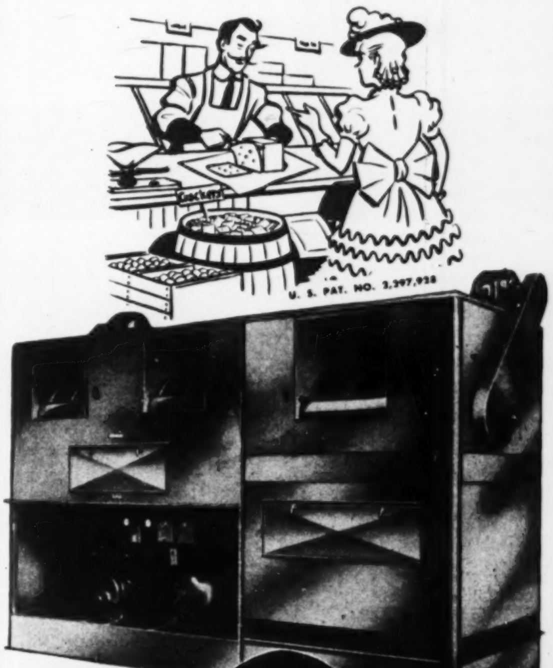
DURANT INSULATED PIPE CO. has moved to a new plant at Warren Way and Bay Road, Palo Alto, Calif. Production of the asphalt-covered, pre-sealed insulated pipe began last October. The new plant is on a three-acre site, and the warehouse and fabricating areas cover approximately 30,000 sq ft. The management estimates that the new plant's capacity will be twice that of the former plant.

A franchise to sell Westinghouse air conditioning equipment has been awarded to the *NATIONAL ENGINEERING CO.* of St. Paul. *J. W. GORE* is head of the company.

District sales managers and some administrative personnel of *PEERLESS PUMP DIV., FOOD MACHINERY AND CHEMICAL CORP.* attended a sales meeting held in Phoenix recently. The meeting covered a review of 1952 accomplishments, the introduction of several new types of pumps, the discussion of manufacturing, sales and distribution requirements, and phases of the company's participation in the export market.

DeBOTHEZAT FANS DIV. of *AMERICAN MACHINE AND METALS, INC.* has announced the appointment of *H. S. McKENZIE CO.* as its new representative for

Packaging has improved lots of things

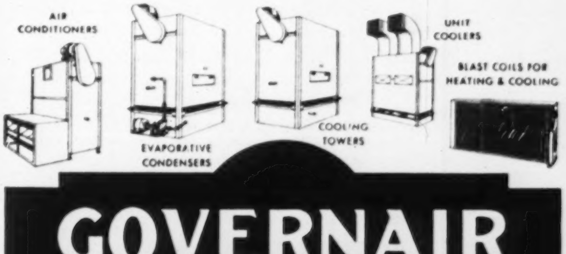


GOVERNAIR
ORIGINATORS OF COMPLETELY PACKAGED
AIR CONDITIONERS

Packaging makes many products more efficient, more convenient and more acceptable these days. And large size packaged air conditioners (up to 60 tons) are no exception!

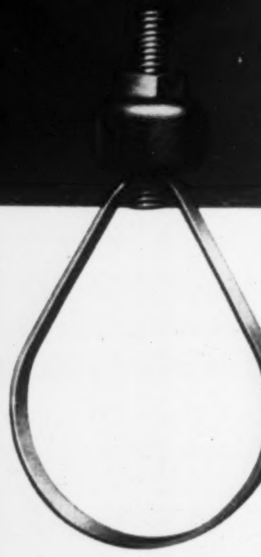
That's why *so many* Governair Completely Packaged Air Conditioners are in use today. They are engineered and built by the pioneers of large size packaged air conditioning — *Governair!*

If you want a package deal that will do a better job of air conditioning for you choose Governair! Sized from 3 to 60 tons. GOVERNAIR CORPORATION, 513 N. Blackwelder, Oklahoma City, Okla.



GOVERNAIR

ORIGINATORS OF COMPLETELY PACKAGED AIR CONDITIONERS!



Give Relief from Time-Wasting Grief

Approved by Underwriters' Laboratories

Double check the time-cost of assembling pipe hangers with the pipe. That's one way to get a conviction that pipe hangers can be time-cost saving tools. Then, use Square "Gee" Pipe Hangers on your next plumbing and heating jobs and you'll know for sure that pipe hangers can reduce installation cost because Grabler Square "Gee" Pipe Hangers give relief from time-wasting grief. Ask your wholesaler for Grabler Square "Gee" Pipe Hangers.

Write for Wall Chart showing complete range of types of Grabler Square "Gee" Pipe Hangers and accessories.

THE GRABLER MANUFACTURING CO.
6565 BROADWAY, CLEVELAND 5, OHIO

THE SQUARE "GEE" LINE INCLUDES: Malleable Fittings • AAR Fittings • Unions • Rail Fittings • Cast Iron Steam and Drainage Fittings • Patented Drainage Fittings • Copper Tube Solder-Joint Fittings • Steel Pipe Nipples • Hangers

Approved by Underwriters' Laboratories

Approved by Underwriters' Laboratories

GRABLER

Oregon and southern Washington. Offices are at 100 Northeast Holladay, Portland 14.

AMERICAN GILSONITE CO. has opened national sales offices at 1145 East Jersey St., Elizabeth 2, N.J. *AARON P. DOWLER* is general sales manager.

REMINGTON AIR CONDITIONING, a division of the Remington Corp., has contracted to supply RCA-Victor with the console type single room air conditioners which the latter will market under its own brand-name in 1953.

BALTIMORE AIRCOIL CO., INC. has sold its fan division, the *BALTIMORE FAN CO.* to *UNIVERSAL INDUSTRIAL PROPELLER CO.* of Stamford, Conn.

ARMCO STEEL CORP. has announced plans to add new processing facilities estimated to cost around $12 million to its plant at Ashland, Ky. This is in addition to the $35 million hot strip mill now nearing completion. The new program includes a cold reduction mill, a continuous cold strip pickler and both light and heavy gage Zincgrip lines. It is expected that the new facilities will go into operation sometime in 1954.

Aluminum production in 1952 reached an all-time high according to year-end statement issued by *PRES. I. W. WILSON* of the *ALUMINUM CO. OF AMERICA.* He said that the industry's estimated primary aluminum output for 1952 should total approximately 935,000 tons when the final figures are compiled. This is almost 100,000 tons greater than the nation's 1951 production and represents an increase of nearly 12 per cent over the total achieved that year. President Wilson also predicted that the 1952 production figure will surpass the industry's high of 920,000 tons reached at the height of World War II in 1943.

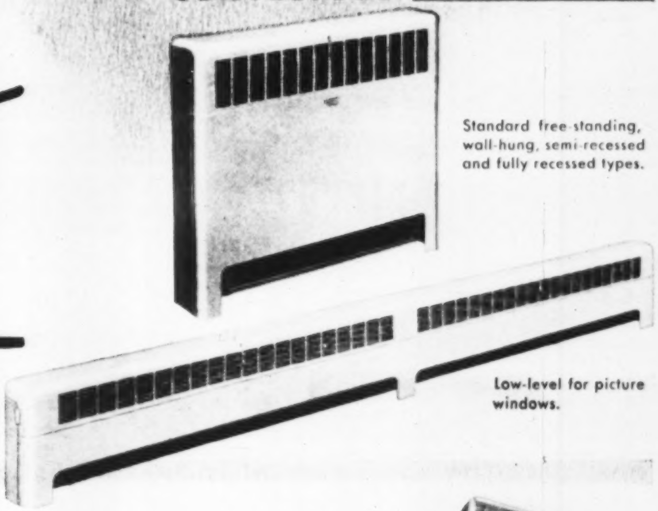
Problems in maintaining efficiency of thermal insulations while protecting them from outside abuse were discussed at a recent meeting held by the *BENJAMIN FOSTER CO.* The three-day meeting, held at the firm's Philadelphia plant and research center, introduced to sales and distributors' staffs, latest technological developments in the protection and vapor-sealing of high and low temperature insulations. Focal point of the meeting was the demonstration of typical applications of coating systems following newly-released Foster Specifications.

According to the *BITUMINOUS COAL INSTITUTE*, mine output of bituminous coal for 1952 is expected to reach roundly 465 million tons despite losses in production due to the two-month shut-down of the steel industry and the slackening in movement of U.S. coal overseas. Total production will be about 13 per cent under 1951, but mine output is considerably ahead of pre-war levels and the outlook for 1953 is promising.

FRAME, INC. of Miami, Fla., has announced its entry into the wholesale distribution field and is presently nego-

Young Quality ®

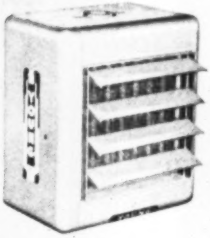
CONVECTORS

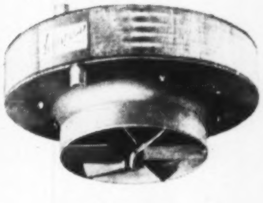


Standard free-standing, wall-hung, semi-recessed and fully recessed types.

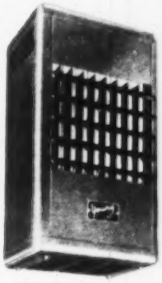
Low-level for picture windows.

UNIT HEATERS



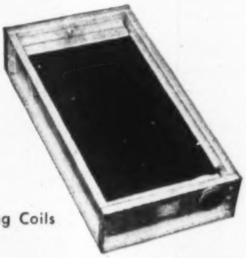


For Use With Steam or Hot Water

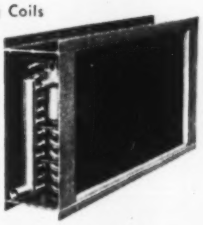


Gas-Fired

COILS

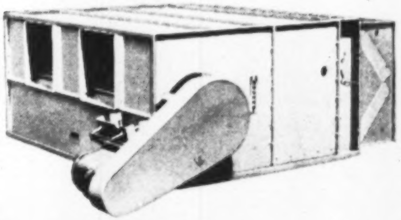


Heating Coils

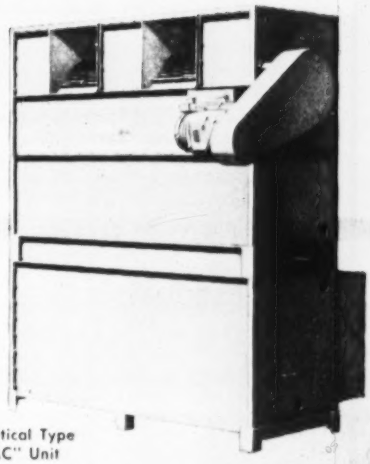


Cooling Coils

AIR CONDITIONING UNITS



Horizontal Type "YAC" Unit



Vertical Type "YAC" Unit

YOUNG

YOUNG RADIATOR COMPANY

DEPT. 513-A, RACINE, WISCONSIN

Factories at Racine, Wisconsin and Mattoon, Illinois
Sales and Engineering Offices in All Principal Cities

Heating, Cooling, and Air Conditioning Products for Home and Industry.

Heat Transfer Products for Automotive and Industrial Applications.

TUTTLE & BAILEY Incorporated

"the following equipment is recommended for testing AEROFUSE DIFFUSERS... Alnor VELOMETER"

Alnor
VELOMETER

That's the recommendation of Tuttle & Bailey for measuring *actual* air delivery of their diffusers—precisely and quickly in the field.

They know from their own tests—in their own complete laboratory—that a few simple readings with a Velometer equipped with a 2230 jet minimizes the time-consuming job of balancing out a system on installation.

The Velometer is the *only* instantaneous, direct-reading air velocity meter—accurate in all ranges, from high to low—compact, portable, easy to understand and use. Wide assortment of jets and fittings makes this precision instrument ideally suited for all air velocity measurement.

Get an Alnor Velometer for your air measurement needs. You'll save time and money wasted in balancing air distribution on your *next* job. If you'd like a copy of Tuttle & Bailey instructions on balancing Aerofuse Diffusers with the Velometer, just send the coupon below.

ILLINOIS TESTING LABORATORIES, INC.
Room 513, 420 N. LaSalle St., Chicago 10, Illinois
☐ Send Tuttle & Bailey Instructions
☐ Send Velometer Bulletin 2448-G

Name..
Company..
Address..
City..................................*State*............

Alnor **ILLINOIS TESTING LABORATORIES, INC.**
PRECISION INSTRUMENTS FOR EVERY INDUSTRY

PYROMETERS • VELOMETERS • DEW POINTERS • PYROCONS
PYRO LANCES • THERMO-ANEMOMETERS • CONTROLLERS

tiating for several major appliance and television lines for the southern Florida territory. The company has recently been appointed distributor of Chrysler Airtemp air conditioners. Officers of the company are: *HERBERT FRAME*, president; *JACK GEARTNER*, vice president; *LARRY COOLIDGE*, secretary.

DeWitt C. Griffin of DeWitt C. Griffin & Associates and A. K. Stillman of Olympia, Wash., have established a partnership to be known as *DEWITT C. GRIFFIN & A. K. STILLMAN, CONSULTING ENGINEERS.*

The outlook next year is highly favorable for the air conditioning and home heating and cooling business, according to *F. J. VAN POPPELEN*, general manager of the Air Conditioning Div. of *GENERAL ELECTRIC CO.* "Tremendous interest has been shown in year-round air conditioning during the past year and 1953 may see a turning point in public acceptance of it as a necessity for better and more comfortable home living," Mr. Van Poppelen said.

CARL LEMMERMAN, president of *INDUSTRIAL SOUND CONTROL, INC.*, of Hartford, Conn., has announced the purchase of the former American Dye plant of the Stevens Mills at Rockville, Conn. The new plant, utilizing 180,000 sq ft, will permit the acoustical concern to consolidate the operations of its five local plants and more than triple its output of sound suppression materials.

Operations in the heating and plumbing industry during 1952 were largely influenced by a combination of four basic factors, according to *THEODORE E. MUELLER*, president of *AMERICAN RADIATOR & STANDARD SANITARY CORP.* Mr. Mueller described these factors as the transition from a seller's market to a buyer's market in the industry, metal shortages, constantly changing needs of the defense effort and government restrictions on the building industry. For 1953, however, the present outlook for a sustained high level of building activity, coupled with generally lower inventories of manufactured products and an improved supply of materials, are favorable industry factors.

THE BUILDING RESEARCH ADVISORY BOARD of the National Academy of Sciences recently held a two-day working conference to determine the best way of reducing building cost of the estimated $10 billion school construction program that is needed in this country and can not be met with community funds. Sponsored by the American Institute of Architects, the Chamber of Commerce of the United States and the U.S. Office of Education, the conference tried to estimate the extent of making economies in school structures. Some of the topics discussed were classroom sizes, special instruction rooms, audio-visual instruction, administration spaces, auditoriums, ceiling heights, low-cost architectural planning and food service facilities. Also possible economies were discussed from the citizen's viewpoint as well as the educator's, engineer's and architect's viewpoint.

There's Less TIME OUT

with SUPER-SILVERTOP Steam Traps

● Plants that trap steam-using equipment with engineered Super-Silvertop Steam Traps find there are four reasons why there is less time out with these cost-saving units.

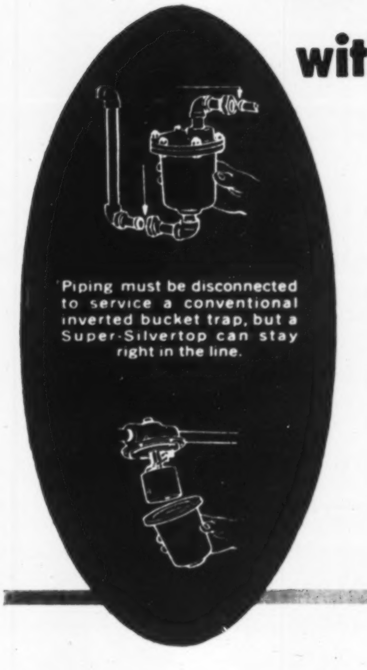
1 You can service a Super-Silvertop much easier than conventional traps, saving up to 30 minutes time. The body can be removed without disturbing a single fitting.

2 Super-Silvertops are easy to install, too. They fit snug, like an elbow or coupling, eliminating unnecessary piping and fittings usually required to hook up conventional inverted bucket traps.

3 Super-Silvertops have rugged, longer-lasting Anderloy valves and seats, eliminating continual replacement of parts.

4 Guided bucket minimizes bucket damage caused when bucket swings free.

Thousands of leading plants are saving manhours by changing to Super-Silvertops. You can, too. Write for a copy of the 36-page catalog, "Solving Steam Trap Problems". It tells how.



Piping must be disconnected to service a conventional inverted bucket trap, but a Super-Silvertop can stay right in the line.

SUPER-SILVERTOPS
...the Engineered Steam Traps

THE V. D. ANDERSON COMPANY

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Gentlemen:
Please send me a copy of "Solving Steam Trap Problems".

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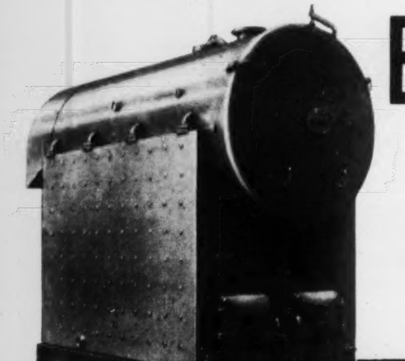
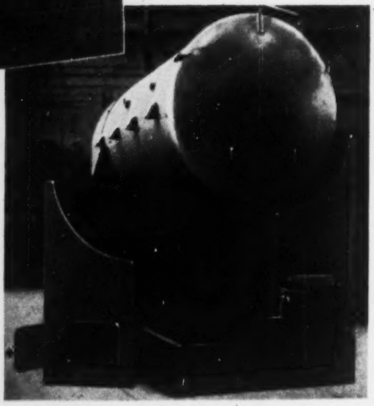
STRAIGHT IN LINE OR AS AN ELBOW

Enjoy
EASY BOILER REPLACEMENT in tough entry conditions!

TITUSVILLE *"Compact"* SPLIT FIREBOX Boilers



Left: Assembled view of Titusville "Compact" Split Firebox Boiler.



Right: The Titusville "Compact" Split Firebox Boiler with sections opened, suggesting ease of manipulation.

TITUSVILLE IRON WORKS CO TITUSVILLE, PA.

For replacement installations where entrance conditions are not sufficient for the standard boiler, Titusville "Compact" Steel Boilers are obtainable in split firebox design. This practical expedient permits passage of the boiler in unit sections through narrow openings, with easy reassembly. Send us your replacement problem, and let us recommend the best solution for you! Request Bulletin Form C-7959 for Clearance Dimensions.

THE TITUSVILLE IRON WORKS COMPANY
A division of Struthers Wells
Representatives in Principal Cities
TITUSVILLE, PENNSYLVANIA

Another new peak in the total volume of construction activity — possibly reaching $44 billion in the United States — is probable in 1953, and an additional $1 billion is expected to be invested in overseas construction by the federal government, according to the *ASSOCIATED GENERAL CONTRACTORS OF AMERICA*. They have estimated an all-time record of $12.3 billion in total construction was put in place in the United States during 1952, representing more than 12 percent of the nation's estimated gross national product, and employing directly or indirectly about 7½ million persons.

THE DELAVAN MFG. CO. of Des Moines, Iowa, has moved to a new plant at Grand Ave. and Fourth St. in West Des Moines. The new plant, completed in November, provides more than twice as much area as the firm's former building.

A "one-a-month" information kit describing permanent magnet application ideas for industry is being sent out by the Carboloy Dept. of *GENERAL ELECTRIC CO.*, Detroit. The kit consists of a heavy permanent binder with six application ideas, each described on a separate loose leaf page. Each month a new magnet application sheet will be distributed. The first six ideas presented are: use of magnets on conveyors to transport ferrous parts, sheet steel separators, floor sweepers to pick up ferrous objects, plant layouts, tool racks and shear tables for cutting sheet metal. Each sheet contains complete technical information and diagrams regarding the particular application described.

During 1953, GENERAL ELECTRIC Co. plans to build an $8 million new small appliances plant at Tyler, Texas. The new plant will employ approximately 2000 persons.

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An Entirely New Volume — 529 Pages
15 CHAPTERS — 6"x9¼"

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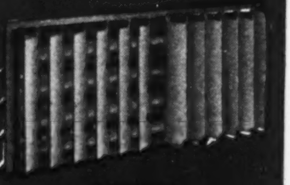

DIFFUSERS
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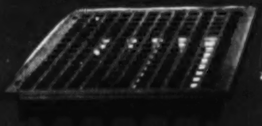

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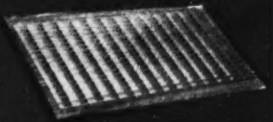

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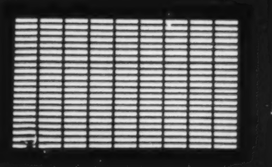
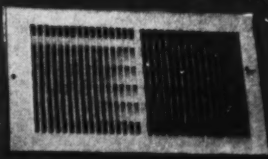
Close Mesh



ARCHITECTURAL GRILLE



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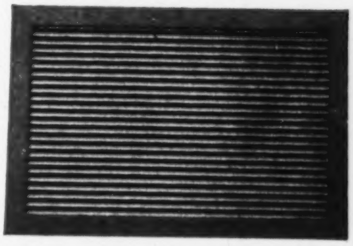
Completely "sight-proof". Channel frame with steel "V" shaped louvers set on approximately ½" centers. Choice of 2 style frames: Channel or Flange. Adjustable auxiliary frame (as illustrated) available at extra cost. Maximum free area. Core thickness, 1". Available any size, choice of finishes.



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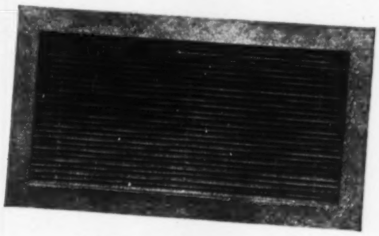

For Doors & Partitions
¼" to ¾" THICK!

- **Cuts Installation Time Over ½!**
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Telescoping auxiliary frame fastens to grille with posts and screws. Clamps tight. No holes to position. Practically ends danger of ruining door. All steel. No vision — 80% free area. All sizes — frame optional. Choice of finishes.

Grilles for PERIMETER HEATING

Designed for floor use, or in walls with high velocity system. Heavy gauge curved vanes factory-set for fan-shaped air pattern. Single adjustable valve in 2¼" width, adjustable multiple valves in 4" and 6" widths. Available in 10", 12", 14" lengths; oak finish or prime coat.

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WITH GREENLEE PIPE BIT SET

Designed especially for plumbers, steamfitters and electricians to provide fast, easy boring of accurate holes in wood for ½" to 2" pipe and conduit. Makes swift, easy work of an otherwise tedious, hard job . . . assures clean "tailor made" openings for a neat job. The set is furnished in a sturdy, attractive metal box with convenient carrying handle. Bits have ½" shanks for use in portable electric or pneumatic drills and in stationary boring machines. An adaptor is provided for standard auger bit braces. Adaptors are also furnished for using standard ⅜" pipe as an extension for deeper boring and longer reach. Get facts today on these timesaving GREENLEE tools.

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Greenlee timesaving tools for plumbing and heating work . . . Hydraulic Pipe Benders • Tubing Benders • Hydraulic Pipe Pushers • Pipe Bits • Auger Bits • Spiral Screwdrivers • Chisles and Many More. Write for details. Greenlee Tool Co., 2341 Twelfth Street, Rockford, Illinois.

WHO'S WHAT

Eight members of the sales and advertising staff of the *HERMAN NELSON DIV.* have recently transferred their offices to Louisville in a consolidation of activities with *AMERICAN AIR FILTER CO., INC.* The changes include: *ROBERT W. NELSON*, who has been named executive assistant to the director of sales; *CHARLES S. STOCK*, manager of the Unit Ventilator Products for American Air Filter; *RICHARD M. BURBANK*, who is executive assistant to Mr. Stock; *JOHN E. HEATER*, chief clerk of Unit Ventilator Products; *ROBERT F. DeLAY*, who is the new advertising manager of American Air Filter; *SAM K. WILSON*, new member of the advertising department; *FRANK T. CARROLL, JR.*, who is new market manager in the Heating and Ventilating section of General Products, and *WILLIAM K. WATKINS*, who has joined the staff of General Products.

LEO C. McROBERTS has been promoted from account executive by *MINNEAPOLIS-HONEYWELL REGULATOR CO.* to market supervisor in the appliance controls division. He will direct sales of automatic control equipment made in the firm's Los Angeles plant. Mr. McRoberts joined the company in 1946.

A. C. HARRISON has been appointed manager of the steel fabricating plant of *THE NATIONAL RADIATOR CO.* Prior to this, he was production supervisor for North American Aviation, Inc.

EARLE H. SCHLITT has joined the air conditioning sales department of *THE TRANE CO.* He had been a project engineer for Wolff & Munier, contractors. Another Trane Co. appointment is that of *GERALD STECKER* as chief accountant.

JAMES F. DONNELLY, who has been assistant general manager of the A. O. Smith Corp. water heater division, has been named vice president in charge of sales for *SERVEL, INC.* Mr. Donnelly, who also is president of the Gas Appliance Manufacturers Assoc., succeeds *JOHN K. KNIGHTON*, who resigned to become president of the Knighton-Keune Co., Servel distributors in Miami, Fla.

E. J. TWEED, president of *DOLE REFRIGERATING CO.* has announced the following appointments and changes in personnel: *ORION L. ROSE*, vice president and general manager; *GEORGE E. FRANKEL*, controller; *HAROLD P. HANSEN*, general sales manager, and *RUDOLPH J. HERMANN*, assistant sales manager.

GEORGE R. McMULLEN, former manager of automotive sales and manager of the Transportation Div. of the Owens-Corning Corp., has joined the sales department of the *GUSTIN-BACON MFG. CO.*

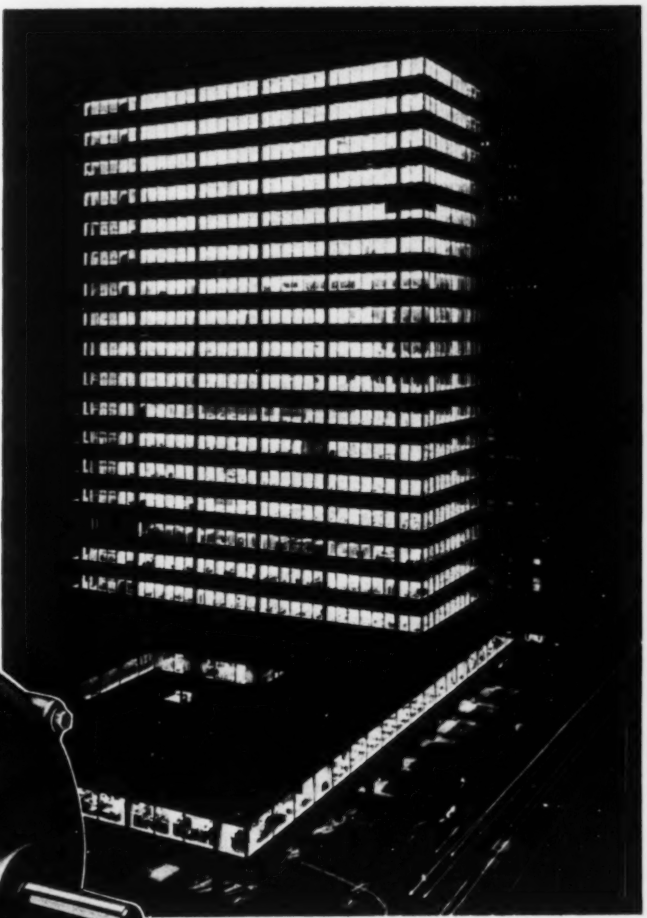
E. H. MARTIN, JR., has been appointed manager of

NEW MILESTONE
in office building design

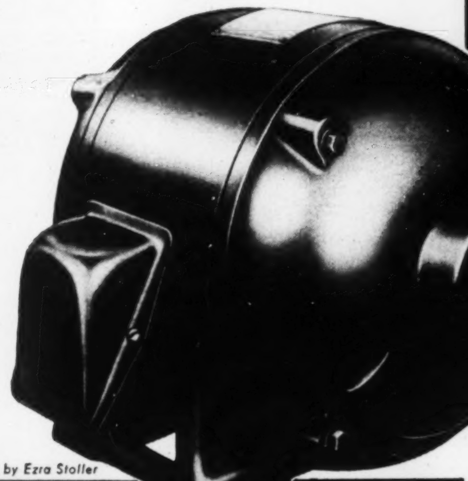
LEVER HOUSE
390 Park Ave., New York

uses

ELLIOTT COMPANY
Crocker-Wheeler Division
for all motor needs!



Architects: Skidmore, Owings and Merrill, New York, Chicago and San Francisco.
Mechanical Engineers: Jaros, Baum and Bolles, New York.
General Contractor: George A. Fuller Company, New York.
Heating and Ventilating Contractor: Kerby Saunders, Inc., New York.



Photo© by Ezra Stoller

This all-glass-and-stainless steel building marks a new forward step in progressive architectural design of office buildings. The air conditioning is operated from three zones — north, south, and interior. Equipment capacities are sufficiently large to enable any two zones to handle the entire load should the third be temporarily shut down.

• • •

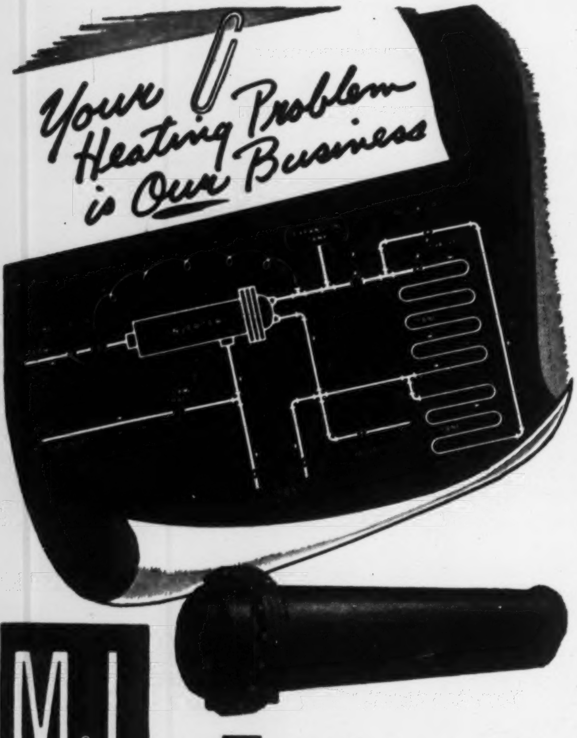
The picture at top of the page shows the effective appearance at night, and the photo below it, the attractive lobby.

You naturally look for the best of everything in the equipment of a building like Lever House. You'll find it too, in this outstandingly beautiful new office structure. Take motors for instance. Elliott Crocker-Wheeler protected-type motors are used throughout in the three-zone year-round air conditioning of Lever House. These are the same sturdy performers that serve air conditioning requirements in the new 525 William Penn Place Building, Pittsburgh . . . 100 Park Avenue Building, New York . . . Macy's Kansas City store — and numbers of other structures where air conditioning at its reliable best is a feature, and a "must" for owner, architect, builder and heating contractor.

In NEMA frames 203-505 inclusive, and larger. Vertical, NEMA C Face or D Flange mountings. All standard voltages and frequencies. Also available with brake. Descriptive Bulletin 6000-1 on request — contact your local Elliott representative or write Elliott Company, Jeannette, Pa.

ELLIOTT CROCKER-WHEELER MOTORS

W2-19


Your Heating Problem is Our Business

M&L ...Traditionally the right equipment for every Water Heating purpose

When your plans include heating water with live or exhaust steam—when they call for hot water supply to radiant heating panels or other hot water systems—then use M & L equipment.

There are many reasons why M & L equipment is traditionally selected for dependable, uninterrupted service—one of which is the extreme care exercised in assembling, to insure longer service life.

Standardized Flexibility

The unique M & L method of fabrication, which permits custom-built equipment to be made from standardized components at a substantial saving in first cost—fits the equipment to the job to be done.

Send for more details on this worthwhile economy. Please include complete operating conditions in your inquiry to receive an accurate, individual proposal.

1954

Manning & Lewis
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M&L
SALES REPRESENTATIVES IN PRINCIPAL CITIES

"Foamglas" low temperature insulation sales of the *PITTSBURGH CORNING CORP.* Mr. Martin has been with the company since 1949 as assistant manager and manager of other divisions of the company.

CHARLES F. STANLEY is the new director of the General Components Div. of the *NATIONAL PRODUCTION AUTHORITY*. Mr. Stanley is on leave to NPA from his post as vice president in charge of sales for The Fafnir Bearing Co., New Britain, Conn.

R. A. PROSSER has been named manager of building equipment sales of the *DURIRON CO., INC.* Mr. Prosser, who has been Chicago district manager since 1945, has moved to the home office in Dayton.

PAUL R. RAUCH has been appointed assistant chief inspector for the Youngstown district of the *YOUNGSTOWN SHEET AND TUBE CO.* He has been with the company since 1939.

New chief engineer of the *REFINITE CORP.* is *EUGENE SCHMIDT*. Mr. Schmidt had been with the Dorr Co. for 15 years designing and installing all types of sewage and water conditioning equipment.

ROBERT JACK has been named assistant manager of the Heating Control Div. of the *IRON FIREMAN MFG. CO.* Formerly, divisional controller of the Portland, Ore. plants, he is being replaced by *HUGH RUSSELL*. Both men have been with the company since 1912.

W. E. VERGAN has been appointed special representative in the railroad products division of the *GUSTIN-BACON MFG. CO.*

BRUCE A. McCANDLESS, formerly assistant to the director of the American Gas Association Laboratories in Cleveland, has been appointed assistant to the managing director of the *AMERICAN GAS ASSOCIATION*. Mr. McCandless joined the laboratory staff in 1939. Another announcement from the association is the election of *J. K. HORTON* as a director. Mr. Horton, president of the Pacific Public Service Co., succeeds *ERNEST G. LAWSON*, who resigned.

JACKSON KEMPER has been appointed general manager, Watson-Stillman Fittings Div. of the *H. K. PORTER CO., INC.* Mr. Kemper will be responsible for all operating and sales activities of the division.

A. T. ERICKSON is the new executive vice president of the *FLEXITALLIC GASKET CO.* Previously, he had been an engineer with Day & Zimmerman, Inc., Engineers, for 14 years.

THE WARREN M. WILSON CO., representative for Conoflow Corp., has appointed *HAROLD T. ZANDERS* to its staff of sales engineers.

Standard is always first with the finest

here it is...
the floor register everyone wants!

STANDARD'S NEW

PERIMETER FLOOR REGISTER

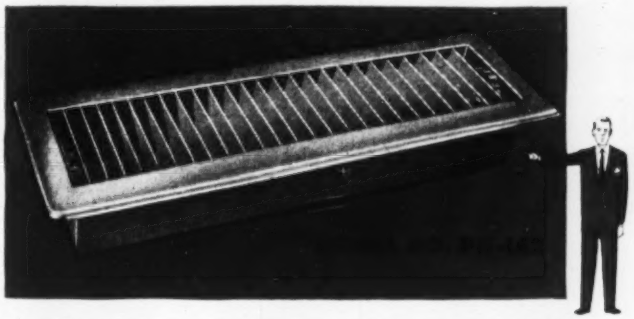
with Standard's exclusive

Dialamatic Control

Standard's new, exclusive dialamatic control gives you POSITIVE HEAT CONTROL. The set screw arrangement means easy balancing, trouble-free operation!

SPECIFICATIONS

The blades of model PH-142 are fabricated of 16 gauge steel, the blades are set in a fixed-fan angle degree for even deflection. The Frame is of one piece, 18 gauge steel construction. The Louvre box fabricated of 16 gauge steel. Packed one to a box, and 20 to a master carton. Comes handsomely finished in gleaming, durable metallic-lustre finish.

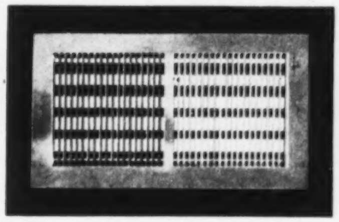


Duct opening	Overall of Louvre Box	Overall of Face	Open Area	Depth of Box
2¼″ x 14″	2⅛″ x 13¾″	3¾″ x 15⅜″	80%	2⅛″

BOOTH 317 11th ANNUAL HEATING AND VENTILATING EXPOSITION

THE NEW, IMPROVED
multiple valve
REGISTER

Has Horizontal Multiple Valve Louvres, and 3/16″ turned down edge for flush sidewall installation. The attached sponge rubber gaskets are an *extra* feature that prevents escape of air and chipping of wall surface. The Louvres are adjustable so that the flow of air may be directed either downward, straight forward, upward, or to complete shut-off.



MODEL NO. 331

Metallic Finish standard finish on this style

Write now for Standard's Free Pocket Catalogue

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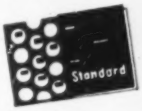
write now!

No cost
or obligation to you



Gentlemen: Please send me your new pocket catalogue at no cost to me.

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ADDRESS __________ CITY __________ ZONE __________ STATE __________
COMPANY NAME ____________________

Standard Stamping and Perforating Co.

3151 West 49th Place—Chicago 32, Illinois

FREDERICK S. BLACKHALL, JR., president and treasurer of the Taft-Peirce Mfg. Co., was elected president of the *AMERICAN SOCIETY OF MECHANICAL ENGINEERS* at the society's 73rd annual meeting in New York early last month. He succeeds *REGINALD J. S. PIGOTT*, chief engineer of the Gulf Research and Development Co. Four new regional vice presidents elected are: *HENRY R. KESSLER*, manager of Republic Flow Meters Co.; *PAUL R. YOPP*, district sales manager, Babcock and Wilcox Co.; *BEN GEORGE ELLIOTT*, professor of mechanical engineering, University of Wisconsin, and *HARRY R. PEARSON*, personnel director of the Dallas Power and Light Co. Elected directors-at-large are *DAVID W. R. MORGAN*, vice president of Westinghouse Electric Corp. and *RALPH L. GOETZENBERGER*, vice president of Minneapolis-Honeywell Regulator Co.

JOHN S. POWELL has been named division sales manager, supervising the Central Division, of the *FARR CO.*

PHILIP H. KREUSCHER has joined *TUBE REDUCING CORP.* as a divisional engineer. Mr. Kreuscher formerly was with U. S. Steel Co. as a design and construction engineer.

MAX JAKOB, D. Eng., heat transfer consultant at Purdue University, was awarded the Worcester Reed Warner medal, "for outstanding contributions to permanent engineering literature" at the recent meeting of the *AMERICAN SOCIETY OF MECHANICAL ENGINEERS.* Dr. Jakob, who came to the United States in 1935, had been a government advisor in Germany on applied thermodynamics, heat transfer and fluid flow and acted as editor of a number of scientific magazines. He is the author of more than 400 technical publications in German and English including *Der Chemie-ingenieur.*

WAGNER ELECTRIC CORP. has announced a number of appointments. *J. S. SMITH* has been named director of purchases and production planning. *H. S. GARRETT* now is purchasing agent with *J. V. CHRISTMAN, M. W. COX* and *E. B. SHANKLIN* as assistant purchasing agents. *FRED CHENEY* has been appointed manager of inventory requirements.

JAMES H. BALDREY has been named supervisor of melting for the *COOPER ALLOY FOUNDRY CO.* Mr. Baldrey had been with Allegheny Ludlum Steel Co. for the past 18 years and since 1939 was manager of melting.

K. M. NELSON has been named division manager of industrial control sales of *CUTLER-HAMMER, INC.* He has been with the company since 1942.

CHARLES H. MARKS has joined the engineering staff of *BITUMINOUS COAL RESEARCH, INC.* in their Columbus office. Mr. Marks came to the United States in 1949 from England where he had been on the staff of the Ministry of Fuel and Power.

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Engineers & Designers
THE NEW A&R
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Presenting—

DESCRIPTIVE LITERATURE
GENERAL ENGINEERING
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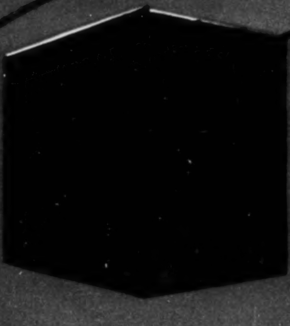
- Capillary® unit conditioners
- Capillary® air washers
- sprayed coil units
- control dampers
- insulated panels
- special purpose driers
- articulated units
- spray air washers
- relief dampers
- rain louvres
- fire dampers

the company

has specialized for many years in the manufacture of air conditioning equipment to satisfy the specific needs of the particular engineer.



From small unit to large industrial apparatus A & R equipment is designed for the duty it is to perform.

Large insulated equipment shipped in panels for bolting together in the field insures "unit" convenience on the largest jobs.

AIR & REFRIGERATION CORPORATION
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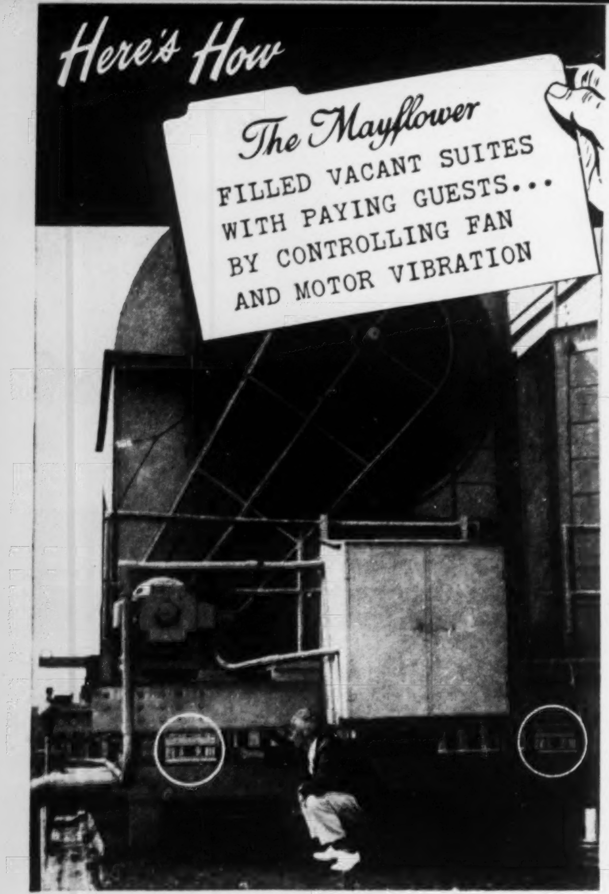


13-Ton Fan and Motor on Roof of
Mayflower Hotel, Washington, D. C.

Vibration from this huge cooling tower fan and motor made it impossible to rent suites on the floor below. Even water standing in drinking glasses showed a decided side-to-side movement.

That's all changed now.

As an executive of The Mayflower recently wrote, "Thanks to the recent installation of Korfund Steel Spring Vibro-Isolators, complaints regarding vibration have ceased."

When installed on roofs and upper floors, large fans, high pressure systems (including the centrifugal compressors), and reciprocating compressors require special consideration. It costs surprisingly little to prevent serious vibration problems with Korfund Vibration Control. There are also low cost Korfund mountings for less critical installations such as centrifugal pumps, most ventilating fans, and for basement and factory installations.

The Selector Chart in Bulletin G-104 gives recommendations for isolation of most equipment for both critical and normal conditions. See Sweet's Architectural or Engineering Files, or write for your free copy today. We'll also submit specific recommendations, without obligation. Just contact us, or the Korfund representative you'll find in most principal cities. A half century of experience is at your disposal.

THE KORFUND COMPANY, INC.

KORFUND VIBRATION CONTROL
SPRINGS RUBBER CORK

41-01F Thirty Second Place, Long Island City 1, N.Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

See us at the International Heating and Ventilating Exposition, Chicago, January 26-30. Booth No. 943.

DR. MIKLOS HETENYI, Walter P. Murphy professor at the Northwestern Technological Institute, has been appointed by the president of the *AMERICAN SOCIETY OF MECHANICAL ENGINEERS* for a five-year term on the executive committee of the Applied Mechanics Div.

HARRY T. KESSLER has been made president and treasurer of the *TUTHILL PUMP CO.*, according to an announcement by *G. B. TUTHILL*, former president and now chairman of the board. *N. G. TUTHILL* was elected vice president and secretary. Mr. Kessler has served as executive vice president since 1943.

Three marketing executive appointments have been announced by *MYSTIK ADHESIVE PRODUCTS. WILLIAM J. MILLER* has been appointed merchandising manager; *JOHN B. PURSLEY*, formerly midwest retail sales manager, now is assistant national retail sales manager; *GRANT V. DISBROW, JR.* has joined the firm as government sales representative. In addition *G. ROBERT ORRILL* was named director of manufacturing and *DR. JAYANTI D. TEJA* is director of research.

GEORGE HEINZE has been promoted to the position of building superintendent for *ALDENS, INC.* in Chicago. He has been with the company since 1945. Prior to that he was at the University of Chicago for 20 years. Mr. Heinze succeeds *WILLIAM STEINBACH* who retired after 33 years of service with the company.

A. I. HOLMES has been appointed manager of "Foamglas" building insulation sales of the *PITTSBURGH CORNING CORP.* He has been associated with the firm since 1940 as a sales representative and as field supervisor of southeastern sales.

CARL E. JOHNSON has been appointed chief engineer of the *SCAIFE CO.* He has been an engineer with the company for 19 years. Another appointment announced by the company was that of *JAMES S. SHUSTER* as product engineer of the Pressure Vessel Div.

EDGAR F. WAINWRIGHT has been appointed manager of appliance sales for the newly formed Appliance Div. of *TRION, INC.* He formerly was sales manager for the Ing-Richards Metal Products Co.

PAUL B. WISHART has been appointed to the newly created post of general manager of the *MINNEAPOLIS-HONEYWELL REGULATOR CO.* and also has been elected to the board of directors. He continues as vice president. Mr. Wishart has been with the firm for 11 years and since 1945 has been vice president in charge of manufacturing in the Minneapolis plants.

L. D. MANDELL, vice president and assistant to the president of *C. A. DUNHAM CO.*, was elected secretary at the recent annual shareholders' meeting held in Marshalltown, Iowa. Mr. Mandell has been with the company since 1930 in various sales, engineering and administrative capacities. At the same meeting, *NEIL T.*

CHADDERDON was elected to the board of directors to replace *L. C. MURTAUGH*, who resigned.

At the annual meeting of the *C. A. DUNHAM CO. LTD.*, of Toronto, Mr. Mandell and *W. S. BROWNING*, sales manager of the parent company, were elected to the board of directors.

Another change announced by the company is the appointment of *JACK W. O'NEIL* as advertising manager. For the past two years Mr. O'Neil has been assistant to the advertising manager of the Skil Corp., Chicago.

DAVID E. FEINBERG has been named general manager of the *UNITED STATES AIR CONDITIONING CORP.* to succeed his father, A. A. Feinberg, who died several months ago. A member of the corporation since 1940, he has been a vice president since 1951 and has also served as sales manager of the refrigeration division and as coordinator of defense production activities.

In a move to assist dealers in their selling programs and to help management in the selection of new products and dealer aids, *CRANE CO.* has announced the organization of a marketing research division. Director of the new division is *FRED C. AKERS.* With the company since 1940, Mr. Akers has served the firm as a member of the sales division, manager of its statistical department and as assistant to the vice president in charge of industrial sales. In announcing the organization of the new division, *PRES. JOHN L. HOLLOWAY* said its scope will be the study of all methods and problems of distribution including the selection, customer acceptance, sale and servicing of present or proposed products of the company or its subsidiaries.

WILLIAM E. BUCHANAN, president and treasurer of the Appleton Wire Works, Inc., has been elected to the board of directors of *ALLIS-CHALMERS MFG. CO.* He fills the vacancy created recently by the resignation of Edmund Fitzgerald.

CHESTER A. BARBECK of *CARRIER CORP.* has been named product promotion manager of "Weathermaker" units with headquarters in Syracuse. During the past four years he has served as merchandising manager for the Dallas district. Prior to this he had been with Servel, Inc. and Chrysler Airtemp.

JACK HARRIS has been appointed district engineer in charge of a new district engineering office opened by *KSM PRODUCTS, INC.* in Milwaukee. Mr. Harris was formerly associated with Gregory Industries. The new district office, which he will head, is another step in the company's expansion program that started with the construction of a completely new plant in Merchantville, N.J.

JOHN K. DUSTMAN of Bronxville, N.Y., has been appointed manager of export sales in the New York office of the *YOUNGSTOWN SHEET AND TUBE CO.* He succeeds Walter A. Davis who died several months ago. Mr. Dustman has been with the company since 1917.

Here's How
PATHÉ
1... Salvaged expensive "lost" office space
2... Cut rejects on film sound track

These two compressors, installed in a machinery penthouse on the 11th floor of the Pathé Television Center, New York, are now mounted on Korfund standard steel spring vibro-isolators. The structural steel saddles shown are not ordinarily required, but were used in this case so that original piping could remain unchanged.

...by controlling vibration

When originally installed, each of these two big compressors was mounted on 4 rubber-in-shear rails, which were not the proper isolation for the vibration frequency and floor conditions.

Consequently, vibration transmission through these "mountings" was so bad that it was impossible to use office space on the floor below, and vibration and noise transmitted through the building were picked up on film sound tracks several floors down.

Now, remounted on Engineered Korfund Spring Isolators, the job is entirely satisfactory and has been in operation for the last three years.

Korfund Engineered Vibration Control would have cost no more in the beginning.

A selector chart in Bulletin G-104 gives basic isolation recommendations for both normal and critical operating conditions for pumps, fans, compressors, refrigerating and other types of mechanical equipment. See Sweet's Catalog Files, or write us for your free copy today.

We'll gladly submit recommendations without obligation. A half century of experience is at your disposal.

THE KORFUND COMPANY, INC.

KORFUND VIBRATION CONTROL
SPRINGS RUBBER CORK

41-01F Thirty Second Place, Long Island City 1, N. Y.
In Canada: 510 Canal Bank, Ville St. Pierre, Montreal

See us at the International Heating and Ventilating Exposition, Chicago, January 26-30. Booth No. 943.

J. F. KNOFF has been named vice president and general sales manager of the *AIRTEMP DIV.* of *CHRYSLER CORP.* Mr. Knoff has been with Chrysler Airtemp for nearly eight years and since 1951 has served as general sales manager of the Airtemp Div.

C. G. ATKIN, president of the *BARBER GAS BURNER CO.* of Cleveland, has appointed *J. D. WILLIAMS* as field supervisor in charge of all service to dealers, distributors and manufacturers. Mr. Williams will make scheduled trips in every territory with year-round operation. He will travel in a station wagon fitted with complete servicing tools and equipment.

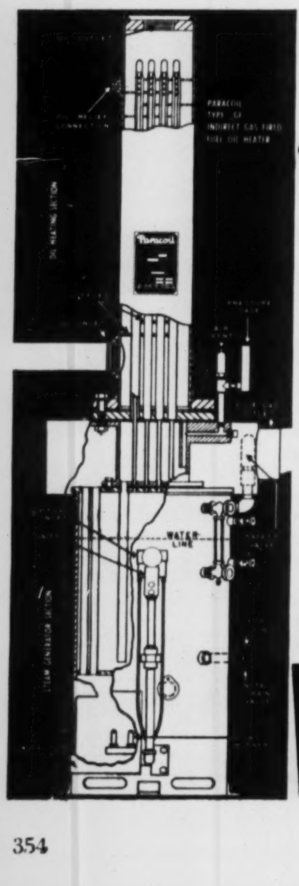
WILLARD M. BROWN, formerly manager of the Washington, D.C. office, has been appointed Philadelphia district manager for *CHASE BRASS & COPPER CO.*, subsidiary of Kennecott Copper Corp. Mr. Brown joined the sales staff of Chase Brass & Copper Co. in Detroit in 1927. In 1938 he transferred to the Chase Cleveland Mill Sales Div. becoming assistant sales manager of the Mid-western Div. in 1940. He was appointed manager of the Washington, D.C. office in 1951.

GLENN E. SEIDEL has been elected a vice president of *MINNEAPOLIS-HONNEYWELL REGULATOR CO.* in charge of engineering in the company's Minneapolis plants. Mr. Seidel, a member of the company's engineering organization since 1943, has been director of the ordnance division for the past year and a half. Before that he served for a number of years as assistant to *W. J. McGOLDRICK*. In his new post, Mr. Seidel will have complete responsibility over research activities and all engineering work carried on in the Minneapolis plants, other than that involving aero products.

PHILIP BORKAT, chief engineer of the *VIKING AIR CONDITIONING CORP.*, recently announced the appointment of *ROBERT M. WOLAVER* to the company's engineering staff. Mr. Wolaver will handle industrial design and exterior styling of the air conditioning and air movement products manufactured by the firm.

Two new vice presidents, *FRED G. RIEDEL* and *CHARLES KNOX*, have been named by *BAKER REFRIGERATION CORP.* Mr. Riedel has had complete charge of all engineering for the company's air conditioning and refrigeration products and will continue to do so. Mr. Knox, who has been with the company since 1910, has been works manager and will continue to have general supervision of all production manufacturing.

SAMUEL GARRE, JR. has been appointed director of sales for *EHRET MAGNESIA MFG. CO.* of Valley Forge, Pa. He was formerly sales manager for the Insulation Div. of the Mundet Cork Corp. and was with that company



A GREAT NEW DEVELOPMENT IN OIL PREHEATER DESIGN

Paracoil Keeps Pace With The Rapidly Changing Needs Of The Oil Burner Industry

The TYPE "GF" INDIRECT GAS FIRED FUEL OIL HEATER

A RADICALLY NEW APPROACH TO THE PROBLEM OF ADEQUATE OIL PREHEATING UNDER ALL OPERATING CONDITIONS!

The Type "GF" Oil Heater is an integrated self-contained steam vapor generating exchanger using gas as its primary heat source.

However, the gas flame does not come in contact with the tubes containing the fuel oil. Instead, vapor from the lower steam generating section does the actual oil heating!

APPLICABLE TO ALL TYPES OF OIL FIRED APPARATUS!

As it is not dependent upon the unit it is servicing for the means of heating the oil, the Type "GF" Heater can be applied to any oil fired apparatus, be it a steam or hot water boiler, a process oven, a dryer or a kiln!

A COMPLETE SOLUTION TO THE OIL-IN-BOILER PROBLEM!

As the Type "GF" Heater is in no way connected to the steam or water space of any boiler it may be serving, there can be no possible contamination of the boiler heating surfaces in the event of an oil leak in the heater.

CHECK THESE FEATURES!

Completely factory assembled • Easy to install anywhere, even outdoors • Requires only minimum of floor space • Economical to operate • Wide range of oil heating capacities • Burns any specified type of gas fuel • High oil temperatures at all times • Operation unaffected by normal variation in viscosities of oils being heated • Reduces oil consumption through improved fuel combustion.

THE PERFECT HEATER FOR:

- Low temperature forced hot water heating systems on No. 6 oil.
- Plants with starting difficulties after week end shutdowns.
- Supplementing inadequacies in present oil preheating systems.

Approved by Board of Standards and Appeals,
City of New York—Cal. No. 362-51SA

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YOUR COPY
TODAY!

DAVIS ENGINEERING
CORPORATION
10 ROCKEFELLER PLAZA NEW YORK 20 NEW YORK • 1064 EAST GRAND STREET ELIZABETH 4 NEW JERSEY

for 21 years. Mr. Garre will direct the company's relations with its numerous insulation contractors across the country and sales activities of company representatives in the industrial, utility, marine and commerical markets.

Announcement has been made by the *NATIONAL RADIATOR CO.* that *ROBERT J. SMITH* has resumed his duties as sales engineer with the company's Baltimore branch after two years of Army service. Mr. Smith joined the company in 1941.

The promotions of *J. D. YOUNG* to field sales manager and *W. F. RYE* to sales service manager have been announced by the *TUTHILL PUMP CO.* Mr. Young has been with the firm for the past 24 years and was formerly sales service manager. Mr. Rye, formerly assistant to Mr. Young, joined the company in 1930.

TACO HEATERS, INC. has announced three new appointments. *E. T. HOULIHAN* now is manager of the Industrial and Refrigeration Dept. He has been with the company since 1930 and has acted in a sales executive capacity for the last 10 years. *HOWARD E. LUCAS* has been named regional sales manager for the states of Maryland, North Carolina, South Carolina, Virginia and Washington, D.C. *WILLIAM J. SLINEY* is the new regional sales manager for southern New Jersey, eastern Pennsylvania and Delaware.

NOW is the time to consider

SNOW MELTING

Systems around Buildings and Grounds

Better send at once for our SNOW MELTING MANUAL. Here are design data based on a study of—and others' actual experience with over 100 snow melting systems of all kinds for

- LOADING PLATFORMS and DOCKS
- SIDEWALKS ● ROADS ● DRIVEWAYS
- MARQUEES ● PARKING AREAS
- RUNWAYS ● RAILWAY SWITCHES

and other applications which HAVE proved that this modern method of snow removal

Costs No More Than Other Methods

—and because snow melting by pipe coils has other distinct advantages, such as dirt-free sidewalks and entrances, and the complete elimination of ice surfaces, the demand for this method of snow removal is swiftly growing.

Complete information on the correct design, installation and operation of snow melting systems is offered in the new SNOW MELTING MANUAL, a reprint of articles originally published in HEATING, PIPING & AIR CONDITIONING.

$1.00 will bring you this SNOW MELTING MANUAL . . . a valuable addition to your file on business opportunities.

Heating, Piping & Air Conditioning

6 North Michigan Avenue **Chicago 2, Illinois**

greater efficiency for

Commercial and Industrial

GAS

fired heating plants with

field

"M-G" draft controls

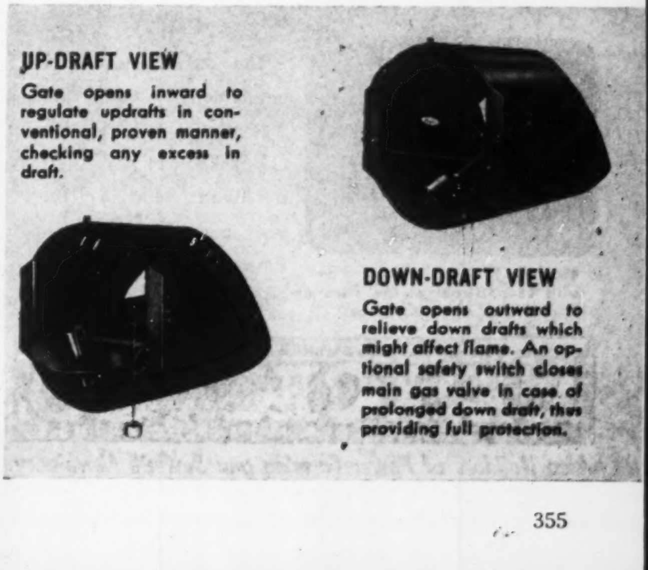
1. Double acting gate opens inward to regulate up-drafts and outward to relieve down-drafts.
2. Adding or taking off weights provide simple adjustment for up-draft conditions at time of installation.
3. Control will relieve internal or down-draft pressures of only a few thousandths of an inch.
4. Weights attached to gate itself are factory set to insure extreme sensitivity to down-draft conditions.
5. Corrosion resistant knife edge bearings resting on self-aligning bearing plates assure extreme sensitivity yet long life.
6. Side wings improve the regulation, making the control accurate at all gate positions.
7. Long collar keeps gate out of the path of flue gases—resulting in greatly increased life.

Now there is a Field Draft Control to provide for commercial gas-fired heating plants the same accurate, dependable, fuel-saving performance that has made Field first choice for oil and coal furnaces. The new Field "M-G" for gas is fully proven, widely accepted, fully safe — a control specially designed for gas but retaining all outstanding design features of the Field Type M Control. Write today for complete information.

FIELD CONTROL DIVISION

of H. D. Conkey & Company — Mendota, Illinois

AFFILIATES: Conco Building Products, Inc. — Brick, Tile, Stone
Conco Materials Handling Division, — Cranes, Hoists



UP-DRAFT VIEW

Gate opens inward to regulate updrafts in conventional, proven manner, checking any excess in draft.

DOWN-DRAFT VIEW

Gate opens outward to relieve down drafts which might affect flame. An optional safety switch closes main gas valve in case of prolonged down draft, thus providing full protection.

DEMONSTRATING THE DEPENDABILITY OF

TRADE FRICK MARK®

EQUIPMENT

The portable steam engine shown above was operated in Virginia from 1872 to 1949: the Corliss type at left, built in 1891, is still running at Irwin, Penna. Another Frick Corliss, shipped in 1888, is still going strong at Weldon, N. C.

Frick Company was established a century ago for making engines and farm machinery. For over 70 years it has pioneered in building refrigerating and air conditioning systems. Frick compressors commonly achieve service records of 40 years; many have run 50; some even 60!

The whole story of Frick equipment is told, with 200 illustrations, in the Centennial History just published: send $1 for your copy. And get estimates now on the cooling system you need.

Modern Frick refrigerating machines have many advantages over this open type built in the 1880's.

450 Hp. Frick Corliss engine with 48-in. stroke at the Penn-Rillton Co., Irwin, Penna.

DEPENDABLE REFRIGERATION SINCE 1882

FRICK Co.

WAYNESBORO, PENNA. U.S.A.

Also Builders of Power Farming and Sawmill Machinery

IN THE TERRITORIES . . .

Establishment of a new Central District has been announced by *HAROLD H. LAYRITZ*, sales manager of the central division of the *LUNKENHEIMER CO.* The central district, headed by *ELMER R. TIEBERMAN* in Dallas, will be divided into five territories: *MARSHALL N. STICKEL*, with headquarters at Houston, will have charge of northeast and southeast Texas and southwestern Louisiana; *JOSEPH A. BIRKHEAD* in Houston will have charge of southwestern Texas; *D. R. DAVIS* will have charge of the Oklahoma, Kansas and western Missouri territory with headquarters in Tulsa; *WILLIAM A. BOLES*, with headquarters in Baton Rouge, will direct the southeastern and northern Louisiana, southern Mississippi and southwestern Arkansas territory; and *BYRON P. ROLAND* has been appointed representative in charge of the west Texas and New Mexico territory, with headquarters at Midland, Texas.

For *HAMMEL-DAHL CO.* — *CONTROL EQUIPMENT CO.* of Atlanta is the new sales and service representatives in Georgia, Alabama and Florida. *ROBERT P. SAUNDERS* is in charge.

For *WESTINGHOUSE* — a franchise has been awarded the *HENRY W. MILLER ELECTRIC CO.*, Omaha, to sell air conditioning equipment.

For *UNITED STATES RUBBER CO.* — *WILLIAM E. KINGSWELL, INC.* of Washington, D. C. is distributor of "Uskon" radiant heat panels. The organization will serve the District of Columbia, northern Virginia and southern Maryland. *WILLIAM E. KINGSWELL* is president and *GEORGE F. MERGELL* is vice president in charge of sales.

For *CONOFLOW CORP.* — *GEORGE CHIPLEY* is to represent the company in eastern Wisconsin. His headquarters are in Milwaukee.

For *JANITROL DOMESTIC-COMMERCIAL DIV.* of *SURFACE COMBUSTION CORP.* — transfer of *G. WARREN STARK*, sales engineer, from the Cleveland district to Louisville. In this new capacity, he will serve the entire state of Kentucky and the southern counties of Indiana.

For *INSUL-MASTIC CORP. of AMERICA* — a new southern regional manager. *JOHN C. TYLER* will be located in the company's Houston office and will travel throughout the south and the Gulf Coast area to handle sales and provide technical assistance to distributors in this territory.

For *PITTSBURGH CORNING CORP.* — a new district sales office and three new sales representatives. *HOWARD G. JONES* has been appointed district manager of the new office at 101 W. 11th St., Kansas City 5, Mo. The office will service distributors of "PC Glass Blocks" and "Foamglas" in Kansas, Missouri, Montana, Nebraska, western

Iowa, Idaho, northern Texas, Utah, Wyoming, Oklahoma, Colorado and New Mexico. *W. T. CLARK, H. R. CONANT, JR., J. P. DILLON, R. L. PERKINSON* and *R. B. SHOFSTALL* will represent the company in that territory.

The three new sales representatives include *W. GRIMM* and *R. W. HENRY* who will assist distributors of "Foamglas" and act as advisor to architects, engineers and contractors concerning the application of this product. Their headquarters are in New York. In a similar capacity will be *N. GLASCOCK*, who will cover the territory of Washington, D. C., Baltimore and the Norfolk and Richmond areas. Mr. Glascock's headquarters will be in Annandale, Va.

For *SERVEL, INC.* — two new distributors to handle air conditioning equipment in Arizona. The *STANDARD SHEET METAL WORKS* in Phoenix has the franchise for Apache, Maricopa, Pinal Coconino, Mohave, Yavapai, Gila, Navajo and Yuma counties. *HEARN PLUMBING AND HEATING, INC.* in Tucson has the franchise for Cochise, Pima, Graham, Santa Cruz and Greenlee counties.

For *MINNEAPOLIS-HONEYWELL REGULATOR CO.* — promotion of *HENRY C. CARLSEN, JR.*, from account executive to regional sales manager in the manufacturers' division. With the company since 1930, he will have charge of a 17-state area in the northwest, southwest and southeast sales regions.

For *YOUNGSTOWN SHEET AND TUBE CO.* — a new sales representative. *GEORGE D. WICK III*, formerly in the Youngstown district sales office, now is representing the company in Charlotte, N. C.

For *JACKSON AND CHURCH CO.* — *ART W. PRACKER* will be factory representative in New York State and western Pennsylvania. He will maintain headquarters in Cleveland.

For *DRAVO CORP.* — *GEORGE W. BAKER* is the sales engineer in the Indianapolis office. For several years he handled sales and services for the company's Machinery Div. in the Pittsburgh territory.

For *QUIET HEET MFG. CO.* — nine representatives for "Quiet Kool" room air conditioners, providing for complete national distribution. Appointment and territories are: *E. I. JONES CO.*, Dallas, to cover Arkansas, Louisiana, Mississippi, Oklahoma, Texas and western Tennessee; *GOODMAN BROS.*, Norfolk, to cover Alabama, Florida, Georgia, North Carolina, South Carolina, Virginia, West Virginia and eastern Tennessee; *WILLIAM J. GALVIN*, Windsor, Conn., to cover Connecticut, Rhode Island, Massachusetts and the Lower Hudson River Valley; *RALPH M. COHEN, INC.*, New York, to cover Delaware, Maryland, eastern Pennsylvania, New Jersey, metropolitan New York and Washington, D. C.; *C. H. ROGERS SALES CO.*, St. Paul, to cover Minnesota, North Dakota, South Dakota and western Wisconsin; *MAYERSON-FOLLMAN* Co., St. Louis, to cover Kansas, Missouri, southern Illinois,

®**Kathabar** goes to work on the Kroger candy lines!

RESULTS:

★ Maintained normal production with 25% less production equipment.

★ Maintenance practically eliminated.

★ No shut-downs for defrosting.

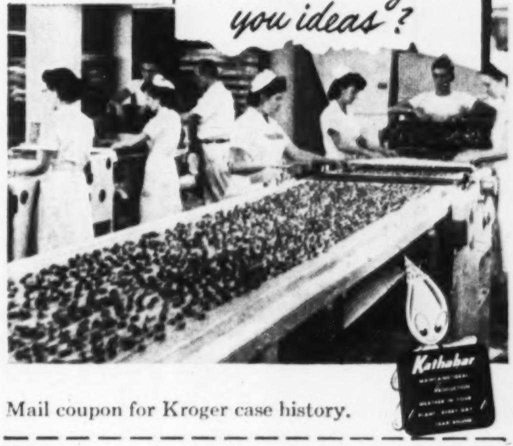
Kroger's candy production line conveyor belt passes over a refrigerated metal slab to set the chocolate candy bottoms. Moisture condensed on the slab and caused erratic belt drive. Production quit . . . and so did profits. Air conditioning with absolute humidity control was the only answer.

A modernization program was introduced. KATHABAR was installed to provide low dewpoint air. This did the trick. Today, Kroger equals its previous top production of candy with 25% less production equipment. The 2500 cfm air capacity Kathabar unit in conjunction with other equipment maintains the room at an 80F temperature and 31F dewpoint—another humidity problem eliminated by KATHABAR.

SURFACE COMBUSTION
Corporation
TOLEDO 1, OHIO

Kathabar
Surface
Janitrol

MEMO:
TO AIR CONDITIONING ENGINEERS...
Doesn't this give you ideas?



Mail coupon for Kroger case history.

OK ☐ Send me the Kroger case history. HP-1
☐ Send me the Kathabar Engineering File Folder.

Name.......................................
Company....................................
Address....................................
City......................Zone.....State.....

BROWN BAYCE HEAVY DUTY HEET

THE NEW LEADER

IN INDUSTRIAL FINTUBE

EXCLUSIVE

All other manufacturers expand the tube to bond the fins. This practice tends to weaken the tube and often results in tube fracture at the weld. Brown Heavy-Duty Bayce-Heet is made by a new improved process. The fins are beaded onto the tube. No expansion of the tube is necessary. Thus the tube is strengthened and will not fracture.

This exclusive Brown process does more! It provides a perfect bond for most efficient heat transfer. It makes it possible to cut and rethread the tube at any point . . . a welcome advantage when an odd length is needed on the job. *No other fintube gives you this advantage.*

EASIER TO INSTALL

GREATER EFFICIENCY

32 FINS PER FOOT

10-15% LOWER COST

SAFETY FIRST! Heavier gauge fins with rounded corners guard against cut fingers when installing.

BOOTHS 933-935
11th INTERNATIONAL
HEATING & VENTILATING
EXPOSITION

ILLUSTRATED LITERATURE ON REQUEST

BROWN PRODUCTS COMPANY
FOREST HILLS, NEW YORK

western Kentucky, southern Indiana and the Nashville area; *GEORGE HATCH*, Los Angeles, to cover Arizona, California and Nevada; *THE SYMPHONEETE CORP.*, Chicago, to cover northern Illinois, northern Indiana and eastern Wisconsin; *HANDEL-DAVIES CO.*, Cleveland, to cover Ohio.

For *GORTON HEATING CORP.* — *MORRIS CHAPMAN* of Framingham Centre, Mass., is sales representative in the Boston area.

For *WAGNER ELECTRIC CORP.* — *JOHN T. KEMPER* is manager of the Boston Electrical Div. office, succeeding *M. E. COMSTOCK* who is retiring after nearly 34 years of service. Mr. Kemper has been with the company since 1940.

For *SERVEL, INC.* — *TAMCO SUPPLY CO.* is distributor for air conditioning equipment in 57 of Florida's 67 counties. The area includes Miami, Tampa and Jacksonville.

For *UNITED STATES AIR CONDITIONING CORP.* — two new distributors in southern Ohio. The *TREATY CO.* of Greenville and The *HESCO CORP.* of Cincinnati. In addition, the *MECHANICAL EQUIPMENT CO.* of Knoxville has been named manufacturer's representative for eastern Tennessee.

Announcement of the opening of a sales office in Buffalo has been made by *BUILDERS-PROVIDENCE, INC.* and *OMEGA MACHINE CO.* The new office will be located at 3053 Main St. and will be known as B-I-F Industries, Buffalo.

For *UNIVERSAL DIFFUSER CORP.* — three new sales agents. They are: *THE AIRES CO.*, Philadelphia area; *HARRIS SALES*, Pittsburgh area, and *LYDICK-BARMANN CO.*, Fort Worth area.

For the *AIR CONDITIONING DIV.* of *GENERAL ELECTRIC CO.* — *MECHANICAL CONTRACTORS SUPPLY, INC.* of Winter Park, Fla. is sole distributor covering Florida and 14 Georgia counties. *PAUL J. SPELLMAN*, is president of the company and *GEORGE J. COLLINS* is vice president and general sales manager.

For *QUIJADA TOOL DIV. of GAINES-COLLINS* — two new district managers: *JACK NATHAN*, eastern district manager and *J. JAY SMITH*, central states district manager. Mr. Nathan's headquarters are New York and Mr. Smith's in Glen Ellyn, Ill.

For *CHASE BRASS & COPPER CO.* — *CHARLES A. FESTGE* is Milwaukee district manager in charge of sales in most of Wisconsin, northern peninsula of Michigan and Lake County, Ill.

MEETINGS & CONVENTIONS

IBR SCHOOL OF MODERN HEATING — January 19 to 21, Indianapolis; January 28 to 30, St. Louis; February 3 to 5, Louisville; February 9 to 11, Cleveland. Students wishing further information may obtain it from The Institute of Boiler and Radiator Manufacturers, 60 E. 42nd St., New York 17.

PLANT MAINTENANCE CONFERENCE AND SHOW — January 19 to 22, 1953, Public Auditorium, Cleveland. Management of the show is Clapp & Poliak, Inc., 341 Madison Ave., New York 17. Sponsored jointly by the American Society of Mechanical Engineers and the Society for the Advancement of Management, it is estimated that some 7,000 products will be shown. There will be 66 sessions, including three panels, 16 sectional conferences, 42 roundtables, four plant tours and a banquet.

NATIONAL HEATING WHOLESALERS ASSOCIATION, INC., 637 Union Commerce Bldg., Cleveland 14 — The annual meeting, January 26 to 28, Congress Hotel, Chicago.

AMERICAN SOCIETY OF HEATING AND VENTILATING ENGINEERS, 62 Worth St., New York 13 — 59th annual meeting, January 26 to 29, Conrad Hilton Hotel, Chicago. See Show Section for details.

11th INTERNATIONAL HEATING & VENTILATING EXPOSITION — THE AIR CONDITIONING EXPOSITION — January 26 to 30, 1953, International Amphitheatre, Chicago. Held under the auspices of The American Society of Heating and Ventilating Engineers. Address inquiries to the exposition management, International Exposition Co., Inc., Grand Central Palace, New York 17. See special Show Section in this issue.

INSTRUMENTATION FOR THE PROCESS INDUSTRIES — Annual symposium, January 28-30, sponsored by the School of Engineering, Chemical Engineering Dept., Agricultural and Mechanical College of Texas, College Station. Primary emphasis will be on applications to continuous fluid flow processes.

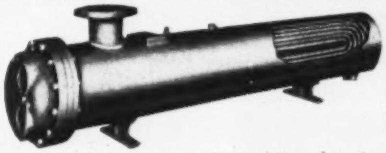
SHORT COURSE IN CORROSION — University of California, Berkeley. — February 2 to 6, five-day course given by the extension and engineering departments in cooperation with the National Association of Corrosion Engineers.

SECOND ANNUAL INDUSTRIAL VENTILATION CONFERENCE — February 16 to 19, Kellogg Center, Michigan State College, East Lansing. Sponsored by the School of Engineering and the Division of Industrial Health, Michigan Department of Health. Class room sessions, talks and demonstrations on practical application of exhaust systems for the control of industrial contaminants.

NEW YORK SECTION OF THE INSTRUMENT SOCIETY OF AMERICA — Sixth annual regional meeting,

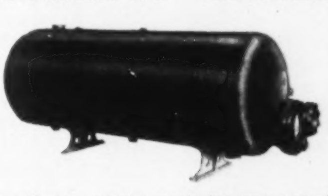
WHITLOCK
HEATING AND COOLING
Equipment

✓ **INSTANTANEOUS HEATERS**



For use where hot water at a nearly uniform rate is desired. Type R shown has a removable U-tube bundle; other designs are available. Write for Bulletin 20A. Write for details on stock heaters.

✓ **STORAGE HEATERS**



Type K Storage heaters supply ample hot water at all times. Whitlock-Everdur construction assures lifetime service: Also made in Eterno and Standard Steel. See Bulletin 40A. Write for details on stock heaters.

✓ **FUEL OIL HEATERS**

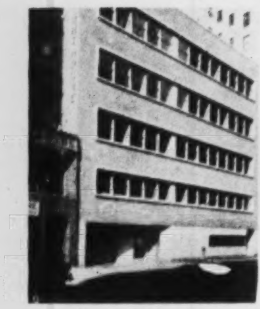
Preheating promotes efficient atomization and burning. Type V-1 Heater shown is easily cleaned without breaking line connections. Whitlock heaters are made in a wide range of types and sizes. Ask for Bulletin 35.

✓ **WATER CHILLERS**

For Air Conditioning service Whitlock chillers are built to meet specific job requirements. The dry expansion cooler illustrated is of U-bend design; refrigerant passes through the tubes and cools water in shell — thus less refrigerant is required and danger of freeze-ups is greatly reduced. Ask for recommendations. Write for Bulletin 140.
Whitlock Engineering Service is complete — Bring your heating or cooling problems to us.

THE WHITLOCK MANUFACTURING CO.

44 SOUTH STREET
HARTFORD 10, CONN.
NEW YORK • BOSTON • CHICAGO
PHILADELPHIA • DETROIT • RICHMOND
Authorized Representatives in Other Principal Cities
IN CANADA: DARLING BROTHERS, LTD., MONTREAL



"Reliable performance" . . . THE LIGHT-HOUSE, NEW YORK CITY, NEW YORK, Association for the Blind, Architects, Clay, Potter & Coulter, New York; Engineer, Harry H. Bond, New York; Heating Contractor, Eugene J. Brandt Company, New York.

"48 zones—1145 families—lowest heating cost per square foot of any public housing" . . . BUNKER HILL PROJECT. Owners Boston Housing Authority; Architect, John M. Gray, Boston; Engineers, R. D. Kimball Company, Boston; Heating Contractor, Florence Company, North Reading, Massachusetts.

New Heating Comfort and Economy

with the B & J Proportionator Control for Vapor Systems

With a B & J Proportionator system of heat control, there is a continuous flow of steam at all times exactly metered to meet the heat losses of the building. The flow of steam to each radiator is increased or decreased as the weather changes. The radiators are filled with steam only when there is a need for full heat. The steam is not completely cut off until the need for heating ceases. The changes in filling are smooth and gradual.

CONTINUOUS FLOW means CONTINUOUS COMFORT because there are no dead points. There is always enough heat to keep the convection currents in a room active. There is no "cold 70°" such as experienced with the "on and off" system. Heating comfort increased to a point never before experienced in hospitals, schools, colleges, commercial buildings and housing projects.

CONTINUOUS FLOW means CONTINUOUS ECONOMY because with the B & J Proportionator you use only the exact amount of steam that is required. CONTINUOUS LOW UPKEEP because the piping in the system is not subject to the frequent expansions and contractions caused by the stops and starts of an intermittent system. Fuel costs have been reduced in some cases up to 50%.

Continuous
FLOW-COMFORT-ECONOMY
TYPE R-1 FOR VAPOR HEATING SYSTEMS
FOR QUALITY
Barnes & Jones
B&J

Ask for the new bulletin on B & J Vapor Control Systems and the bulletin on the B & J cage units which make new systems out of old without replacing the trap housings or the valve seats.

B&J for QUALITY
Barnes & Jones
INCORPORATED
REPRESENTATIVES IN PRINCIPAL CITIES
BOSTON 30, MASSACHUSETTS

February 18, Hotel Statler, New York. Technical program consists of sessions covering process instrumentation, power plant instrumentation and biological instrumentation.

NATIONAL ASSOCIATION OF CORROSION ENGINEERS, 1061 M & M Bldg., Houston 2. — Conference and exhibition, March 16 to 20. Titles of six papers to be given are: "Use of All-Plastic Equipment and Piping in Technical Corrosion Protection;" "Corrosion by Acids at High Temperatures;" "Metallurgy of Corrosion;" "Statistical Analysis of Corrosion Data;" "Corrosion Study in a Salt Plant;" "The Behavior of Titanium in Sulfuric and Hydrochloric Acids."

NEW JERSEY SOCIETY OF PROFESSIONAL ENGINEERS, INC., 86 E. State St., Trenton — 29th annual convention and exhibition, April 17-18, Hotel Essex House, Newark.

AIR POLLUTION CONTROL ASSOCIATION, 4400 Fifth Ave., Mellon Institute Building, Pittsburgh — Annual meeting, May 25 to 28, Lord Baltimore, Baltimore.

NATIONAL DISTRICT HEATING ASSOCIATION, 827 N. Euclid Ave., Pittsburgh 6. — 44th annual meeting, June 9 to 12, Lookout Mountain Hotel, Chattanooga, Tenn.

AMERICAN WELDING SOCIETY, 33 W. 39th St., New York 18. — National Spring Technical Meeting, June 16 to 19, 1953, Shamrock Hotel, Houston. Includes a four-day Welding and Allied Industry Exposition in the Shamrock Hall of Exhibits.

manufacturers' agents:*

here's an easy-to-sell item-proven for 25 years

Schwan "Packaged" power-type

GAS BURNER

Schwan PACKAGED burners are shipped completely assembled with all parts. No critical adjustments or difficult installations. Gas connected to pipe union; electricity through limit controls to burner-panel terminals. That's it!

FOR IMMEDIATE SHIPMENT: 10 sizes (600,000 to 10,000,000 BTU)

*OPPORTUNITY for representatives with some combustion engineering experience. For full details about territories, WRITE TO

Ashcraft Fuelguard
5643 Dyer St. • Dallas

It's Automatic!
It's Accurate!
It's Dependable!
It's Self Operated!

It's the LOW PRICED

TEMPERATURE REGULATOR

STACON SERIES V for STEAM LIQUIDS GASES

- SIMPLE, RUGGED, LOW COST, FIELD-REPLACEABLE THERMOSTATIC SYSTEM
- TIGHT SHUT-OFF; Self aligning single seated construction insures tightness.
- SUPER-POWER INSTANTANEOUS RESPONSE; Liquid expansion, throttling action, insures positive, constant control.
- OVERLOAD PROTECTION
- EXTREMELY COMPACT AND STURDY

Write for Bulletin ST-162 Today

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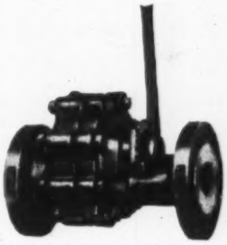
STACON CORP.
400 Commercial Ave., Palisades Park, N. J.

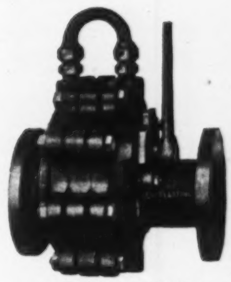
AFFILIATES
FARRIS ENGINEERING CORP.
FARRIS FLEXIBLE VALVE CORP.
FARRIS HYDROTORQUE CORP.
FARRIS HYDROSEAL CORP.

EVERLASTING® VALVES

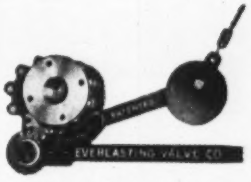
mean "Everlasting" Protection on these duties



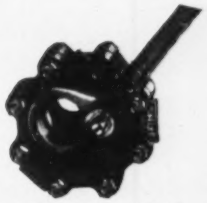
GENERAL SERVICE
Wherever frequent use and quick operation is required for any liquid or gas at pressures up to 300 psi. Have outside stuffing box and gland.



STEAM JACKETED
Assure continued free flow of any material which congeals at ordinary temperatures.



FIRE PROTECTION
Closing type for inflammable liquid emergency shut-off, or opening type for deluge or drainage, assuring immediate and positive action with weighted pendulum stop.



BOILER BLOW-OFF
Quick-opening, also handwheel operated Angle and "Y" types and combination units meeting ASME Code requirements for pressures up to 600 psi.

For more than 40 years, EVERLASTING VALVES have been known for their ingenious design, simple sturdy construction, and long trouble-free life with low maintenance expense. Some of their distinctive features are:

Quick-Action . . . opened or closed with less than a quarter turn of the operating lever.

Straight-Through Flow . . . the disc cannot become loose and accidentally check the flow.

Drop-Tight Seal . . . constant contact of disc and seat at all times prevents dirt or scale from getting between.

Self Regrinding . . . the disc rotates on the seat with each operation, thus regrinding the sealing surfaces.
No Wedge Action . . . all parts move between parallel faces.

Write for bulletin describing EVERLASTING VALVES in detail.

Trade-Mark "Everlasting" Reg. U.S. Pat. Off.

EVERLASTING VALVE COMPANY
49 FISK STREET, JERSEY CITY 5, N. J.

Simplify Piping jobs
by using
JEFFERSON SPECIALTY UNIONS

Assure tightness without jamming

JEFFERSON is the UNION that stays tight without jamming and saves time, space and money on any piping job. There's a Jefferson Specialty Union in all styles of Ells and Tees to simplify jobs, and make close fits easy. You're sure of a better job every time when you use JEFFERSONS.

Remember this: Jefferson Unions are made of a fine malleable iron having a tensile strength of 55,000 lbs. per sq. in. Seat rings are cut from special brass tubing (not cast); careful machining avoids any chance of seat rocking. Here are the Unions backed by more than 50 years specialization . . . ready for your needs TODAY.

Try Jeffersons once and you'll use them regularly.

JEFFERSON UNION CO.
607 West 26th St., New York 1, N.Y.
35 Fletcher Ave., Lexington, Mass.
65 Gooding St., Lockport, N.Y.

NEW BOOKS & REPORTS

Refrigerating Data Book

Refrigerating Data Book, Applications Volume, is one of a continuous series of books published by the American Society of Refrigerating Engineers since 1932. The contents are intended to cover the use of refrigeration and refrigeration machinery. This year's application volume covers the use of the science and art of refrigeration and the application of refrigerating machinery and associated equipment to solve the user's needs. The 65 chapters are divided into eight sections covering frozen foods, refrigeration in food manufacture, refrigerated warehouse practice, refrigerated food distribution, low temperature applications, industrial application of refrigeration, comfort air conditioning and industrial air conditioning. The 216-page illustrated book is indexed by authors and subjects.

Copies may be obtained at $7.50 each from the American Society of Refrigerating Engineers, 40 W. 40th St., New York 18.

Frick Centennial Story

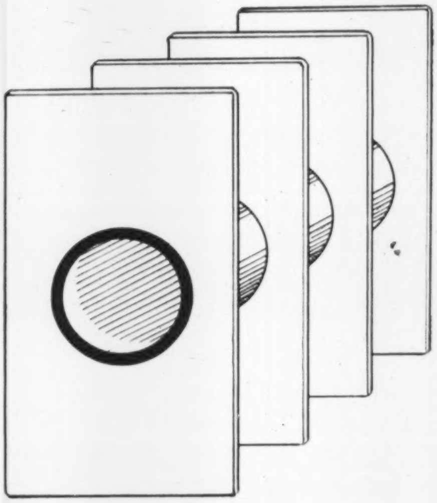
The Frick Co. of Waynesboro, Pa., manufacturers of refrigerating, air conditioning, farm and sawmill machinery, this year is celebrating its 100th anniversary. To commemorate the occasion, it has published a history of the company, *Celebrating a Century of Engineering*

PRESSURE TUBING
makes AUTORAD more efficient

AUTORAD finned radiation is definitely more efficient than conventional radiation because AUTORAD forms fins on pipe-size *pressure tubing* instead of on pipe. For maximum heat transfer the tubing must be precisely *uniform in diameter* and — what's more important — must be *perfectly round.*

Pressure tubing costs more than pipe but the *extra* efficiency you get from AUTORAD is worth far more than the extra cost in manufacture. If you want the *best* in finned radiation, specify AUTORAD — always.

Ask for complete data



AUTORAD finned radiation includes factory-dimensioned finned tubing and attractive enclosures. Easy to install; completely satisfactory to both contractor and owner.

AUTO-RAD Inc.

Manufacturers of Heat Transfer Equipment Since 1920
3535 W. Fillmore St., Chicago 24, Ill.

MEASURE AIR VELOCITY DIRECTLY AND ACCURATELY

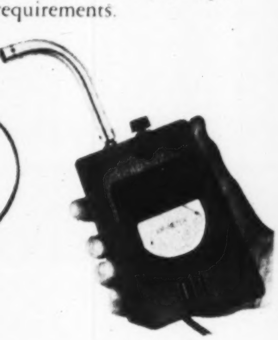
WITH A

HASTINGS AIR-METER

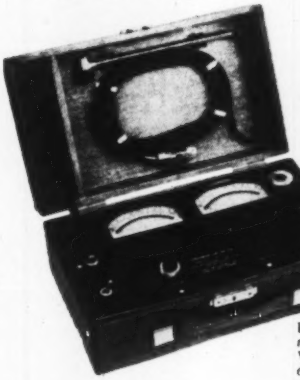
The most sensitive of all air meters for research, industrial and agricultural applications. Reads directly in feet-per-minute on a logarithmic-type scale expanded at lower velocities. Highly sensitive — will indicate the velocity of smoke rising from a cigarette. Response time less than one second. Accurate to within ± 2% regardless of ambient temperature or static pressure.

Uses the exclusive Hastings noble metal thermopile in an extremely stable circuit. Instantaneous range switching without recalibration. Probes available for directional or non-directional reading. Easily adapted for remote recording since the calibration is independent of lead length. Available in several models to meet your specific requirements.

Hastings Model H Air Meter. Compact unit for field and laboratory use. Velocity Ranges: 10-750 fpm; 750-5500 fpm.



Hastings Model G Air-Meter: Small hand type instrument. Velocity range: 0-6000 fpm; Weight: 26 ounces.



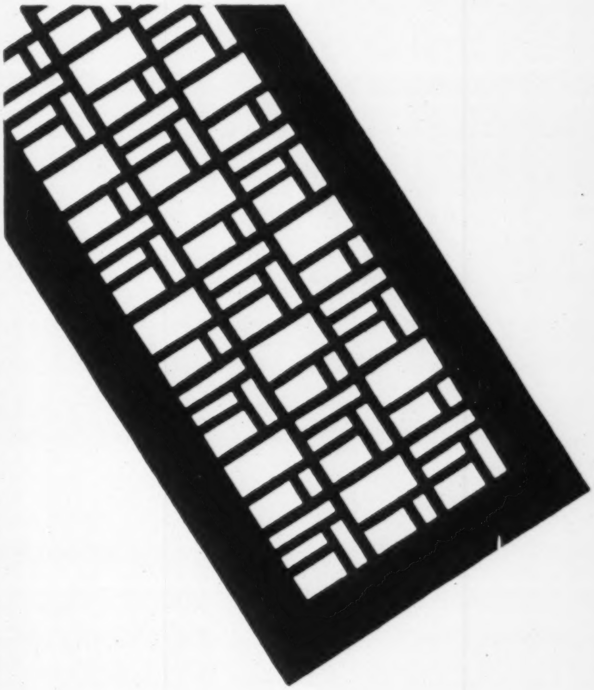
Hastings Model B Air Meter for measurements of greatest precision. Velocity ranges: 0-400 fpm; 400 to 6,000 fpm. Meter type continuous calibration check. Knife edge, parallax free indicator.

Write for descriptive literature and prices on Hastings Air Meter, Manometer and Flowmeters, and Vacuum Gauges.

HASTINGS INSTRUMENT COMPANY, INC.

HAMPTON, 33 VIRGINIA

DESIGNERS AND BUILDERS OF RAYDIST AND SPECIAL
ELECTRONIC, ELECTRICAL, AND MECHANICAL INSTRUMENTS



For every kind of GRILLE installation

For either standard or unusual types of installations, there is a Hendrick Perforated Metal Grille that will meet your exact requirements.

Sometimes when installing a grille it is desirable to provide a hand hole door to give access to radiator valves or window locks. Any Hendrick Grille can be provided with a swinging door for this purpose, and when closed the edge of the door will hardly be noticeable.

These doors are regularly fitted with a bullet style spring catch to hold them in the closed position and the catch is completely concealed. When desired, however, doors can be furnished with small cylinder locks.

Hendrick Grilles are available in over a hundred designs, in a wide range of overall dimensions, bar sizes, number of perforations and size of perforations. Write for full information.

SEE OUR CATALOG IN SWEET'S

Perforated Metals
Perforated Metal Screens
Wedge-Slot Screens
Architectural Grilles
Mitco Open Steel Flooring,
Shur-Site Treads, Armorgrids

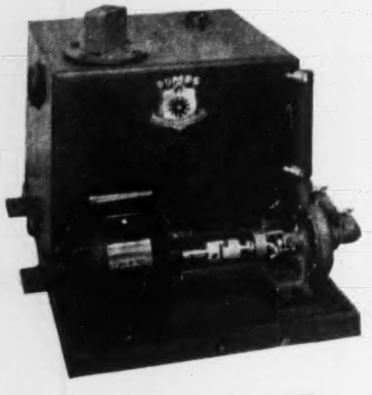
HENDRICK
Manufacturing Company
48 DUNDAFF STREET, CARBONDALE, PA.
Sales Offices in Principal Cities

ANNOUNCING—

The New Improved Design

EAGAN "EAGLE"

CONDENSATE PUMP



MATCH THIS FOR VALUE!
Here's the best condensate pump "buy" on today's market. It provides far more capacity than any similar pump . . . 8,000 sq. ft. EDR at 20 PSI . . . and it's only $124.00 (trade price, F.O.B. Phila.)

REDUCED PRICE

Compare These Six Features

IMPROVED DESIGN

- Low inlet, 2" I.P.S., 12" from floor
- All bronze centrifugal pump
- Standard ¼ HP 115 volt quiet capacitor motor
- Thermal overload protection
- Driplip base of heavy structural steel with ½" tapped drain
- Flexible connectors on both suction and discharge of pump, and flexible coupling isolate the pump, preventing pipe cramp and misalignment, which cause wear and noise

OTHER MODELS TO 100,000 SQ. FT. 200 P.S.I.

WALTER H. EAGAN CO., INC.
Mfgs. of Condensate, Vacuum, Turbine, Boiler Feed and Centrifugal Pumps.
Pump Specialists since 1920

WALTER H. EAGAN CO., Inc. (Dept. B)
2336 Fairmount Avenue
Philadelphia 30, Pa.

MAIL COUPON TODAY

SEND ME FREE DESCRIPTIVE BULLETIN OF THE NEW EAGAN "EAGLE" CONDENSATE PUMP

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COMPANY ....
STREET ....
CITY .... Zone ... State ....

Service. The year-by-year story of the firm's growth is illustrated by the reproduction of sections of early catalogs and advertisements illustrated with handmade wood cuts. Models of the original machinery manufactured by the company are shown with photographs of their gradual improvement. Many business papers and plans of the original George Frick have been preserved and reproduced in this publication.

Heat Transfer

Heat Transfer Phenomena treats heat transfer as a particular example of the class of transport phenomena and gives a concise account of all the recent advances in the field. Written by Dr. R. C. L. Bosworth, manager of the research department at the Colonial Sugar Refining Co. in Sydney, Australia, the book discusses the classification of transfer process, the thermal conductivity of gases and thermal radiation and conductivity in condensed phases. Information is provided on natural convection, forced convection or the simultaneous transport of heat and momentum, the simultaneous transport of heat and mass, the use of the equivalent electrical circuit and thermodynamical similarity.

The book is published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, and is priced at $6.00 a copy.

Freight Classification Guide

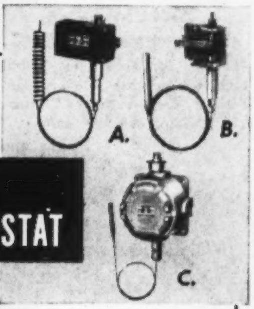
The General Traffic Committee of the Refrigeration Equipment Manufacturers Association has been working for about a year on a guide for the refrigeration and air conditioning industry. The resulting *Freight Classification Guide* will be published in the near future. The

A. TYPE E5

B. TYPE F42

AN ACCURATE ADAPTABLE THERMOSTAT

C. TYPE E98



The type E5 thermostat is a precision-built temperature control which can be fitted with a wide variety of thermal assemblies and switches to suit the particular application. Temperature limits -150° F to +600° F.

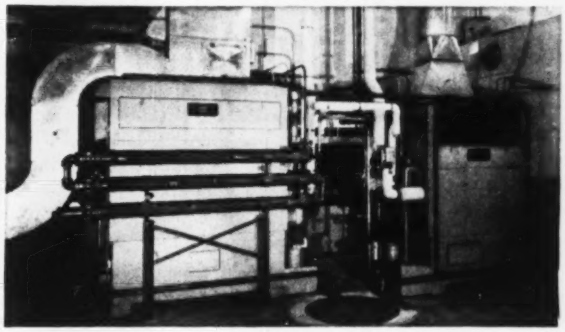
The type E5 has been used on ovens, water baths, incubators, hot plate presses, cooling cabinets, air conditioning equipment, food and drink vending machines. Shown are three variations, the E5 covered by bulletin #3-2, Type F42 "skeleton" model covered by bulletin #3-3, and Type E98 in explosion-proof housing covered by bulletin #3-5. Write for information on the models of interest to you.

UNITED ELECTRIC CONTROLS COMPANY
87 School Street, Watertown, Mass.

STANDARD & SPECIAL THERMOSTATS & PRESSURE SWITCHES

Niagara's HYGROL DRIES AIR BEST

with exact moisture content



NIAGARA CONTROLLED HUMIDITY AIR CONDITIONING

This method removes moisture from air by contact with a liquid in a small spray chamber. The liquid spray contact temperature and the absorbent concentration, factors that are easily and positively controlled, determine exactly the amount of moisture remaining in the leaving air. Heating or cooling is done as a separate function.

The Niagara's Controlled Humidity Method using HYGROL moisture-absorbent liquid is

Best and most effective because . . . it removes moisture as a separate function from cooling or heating and so gives a precise result constantly and always. Niagara machines using liquid contact means of drying air have given over 20 years of service.

Most reliable because . . . the absorbent is continuously reconcentrated automatically. No moisture-sensitive instruments are required to control your conditions.

Most flexible because . . . you can obtain any condition at will and hold it as long as you wish in either continuous production, testing or storage.

Easiest to take care of because . . . the apparatus is simple, parts are accessible, controls are trustworthy.

Most compact, taking less space for installation.

Inexpensive to operate because . . . no re-heat is needed to obtain the relative humidity you wish in normal temperature ranges and frequently no refrigeration is used to remove moisture.

The cleanest because . . . no solids, salts or solutions of solids are used and there are no corrosive or reactive substances.

For complete information write

NIAGARA BLOWER COMPANY

Over 35 Years of Service in Industrial Air Engineering

Dept. HP, 405 Lexington Ave. New York 17, N. Y.

Sales Engineers in Principal Cities of U. S. and Canada

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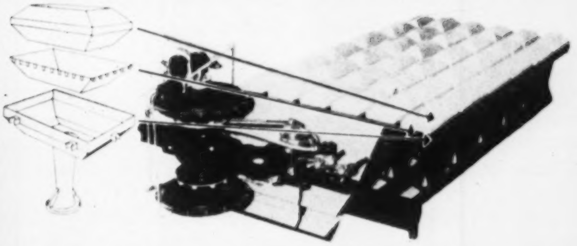
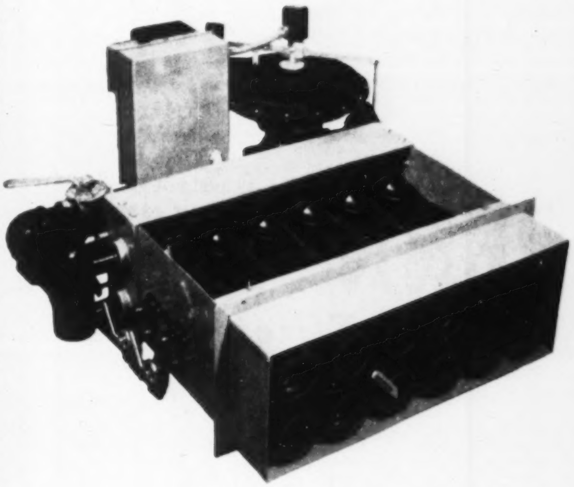
for Gas Firing



The UPSHOT TRULIRADIANT GAS BURNER

for vertical firing of steel firebox, cast iron and brickset boilers. An outstanding burner with specially designed refractory protection for burner heads insuring long life and providing maximum heat transfer to boiler surfaces for high efficiency.



The HORIZONTAL or TYPE "H" GAS BURNER

for Scotch Marine or other type boiler where the "Inshot" type of firing is preferred. Multiple flame retention heads assembled in a heavy gauge housing with balanced air louvres and specifically designed pilots provide the maximum in flexibility and dependability. Complete prewiring and factory assembly of controls simplifies, and cuts hours from installation time.

Write for literature

Gordon & Piatt

P. O. BOX 332
WINFIELD, KANSAS

CONTRACTORS—CUT YOUR COSTS ON THESE JOBS—

- ★ MOUNTING UNIT HEATERS
- ★ LIFTING AIR CONDITIONING UNITS
- ★ SETTING HOT WATER HEATERS
- ★ PLACING PIPE AND DUCTING

The rugged 1½ ton capacity LUG-ALL Winch-Hoist can reduce your installation costs in these simple direct ways.

DO THE JOB WITH FEWER MEN: That's true — because the LUG-ALL weighs under 10 lbs., is complete and compact — yet outpulls five (5) men on a rope block rig.

DO THE WORK FASTER: Light weight helps a lot. Getting to the job and setup is definitely easier. And the built-in pulley block with triple hook system works in any direction. There is always a LUG-ALL way to do the job.

Users are enthusiastic. Mr. C. T. DuBreuil of Ohio recently stated: "Of all the labor saving devices I have purchased in the last 18 years, our two LUG-ALLs have drawn the greatest praise from the men in the shop".

And the price, complete with 10 ft. of cable is

ONLY **$35.25** FOB Factory

YOU CAN'T GO WRONG WITH A LUG-ALL. ORDER ONE TODAY. Or request fact packed LUG-ALL BULLETIN NO. 116. Just off the press, it's yours for the asking. It is filled with answers on your equipment handling problems. WRITE US TODAY.

LUG-ALL DATA

Alloy frame withstands 5 ton load. Flexible aircraft cable. Stainless steel springs. Bearings oiled-for-life. Safety handle prevents overload. Cable stores out of way on drum. Interlocking pawls never slip.

GUARANTEE

Every LUG-ALL guaranteed one year against defects in workmanship and materials.

PROMPT DELIVERY

THE LUG-ALL COMPANY
WYNNEWOOD 29, PENNA.

new Guide will give the correct product description of approximately 700 items showing both the Uniform Freight Classification and the National Motor Freight Classification. Also included will be the correct classification or bill of lading description for both rail and truck shipments.

Publishers are the Refrigeration Equipment Manufacturers Association, 1346 Connecticut Avenue, N. W., Washington, D. C.

Mechanics of Materials

Advanced Mechanics of Materials now is available in an entirely rewritten second edition. Prepared by Fred B. Seely and James O. Smith, professor emeritus and professor respectively of theoretical and applied mechanics at the University of Illinois, the volume supplies a comprehensive view of the fundamental concepts and methods used in the analysis of stresses in structural and machine members. It emphasizes the relationships between design, stress formulas, failure of materials and failure of machine or structural parts.

Two new sections cover the influence of small inelastic strains on the load-carrying capacity of members, instability and buckling loads.

Published by John Wiley & Sons, Inc., 440 Fourth Ave., New York 16, it contains 443 pages and is priced at $5.50 a copy.

Coal Annual

Copies of the 1952 edition of the *Bituminous Coal Annual* now are being distributed by the Bituminous Coal

PENN VENTILATORS

Perform Efficiently . . . Economically!

There is a type, size and capacity for all your ventilating requirements. Efficient and economical Penn Ventilators are easily installed and last long, providing years of trouble-free, inexpensive ventilation. They have been removing dust, vapors, smoke, heat, fumes and odors from public, commercial and industrial buildings for more than a quarter of a century.

Write for descriptive literature on the entire line or send us your specific problems for qualified recommendations.

Manufacturers of:
Propeller Fan—Centrifugal Fan, Stationary, Rotary and Ridge Roof Ventilators and accessory products. Representatives and distributors in principal cities.

PENN
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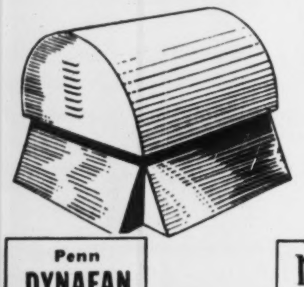
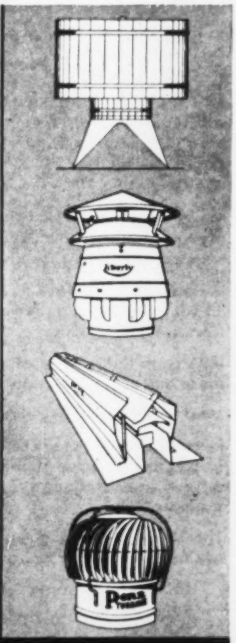


Penn
DYNAFAN

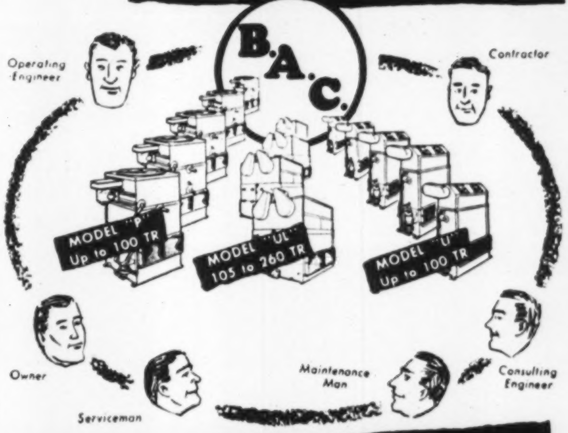


PENN VENTILATOR CO.
Main Office and Factory
North Goodman St. & Allegheny Ave.
Philadelphia 40, Pa.

FOR MORE THAN 25 YEARS THE BUILDERS' ROOF TOP LINE!

NOW YOU CAN SEE

WHY EXPERTS AGREE IT'S



—for the FINEST in
Evaporative Condensers
and Cooling Towers

VISIT B.A.C. BOOTH No. 939

ASH&VE Show • January 26-30 • Chicago

Yes, now you can see for yourself why B.A.C. Evaporative Condensers and Cooling Towers are rated tops among the key men in the Air Conditioning and Refrigeration field.

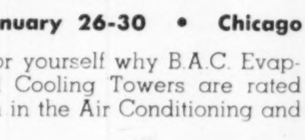
RANGE: World's Widest Range. . B.A.C. Evaporative Condensers in sizes up to 250 TR and Cooling Towers in sizes up to 225 TR. . IN A SINGLE, FACTORY-ASSEMBLED UNIT!

ECONOMY: Factory-assembled units simplify your installation and greatly reduce your installation cost. Your initial cost is definitely lower.

LONG LIFE AND DURABILITY: All casings are rigidly constructed of galvanized sheets, providing full protection against corrosion. All reinforcing structurals are hot dipped galvanized. B.A.C. Evaporative Condensers have all prime surface condensing coils, fabricated of ¾" full weight steel pipe, hot dipped galvanized after fabrication. Suitable for either Freon or Ammonia application.

EASE OF MAINTENANCE: All B.A.C. Evaporative Condensers and Cooling Towers are provided with large access doors and removable air inlet louvers for easy inspection and maintenance of eliminators, sprays, coils and sumps.

BALTIMORE AIRCOIL CO., INC.
2615 MATHEWS STREET
BALTIMORE 18, MARYLAND



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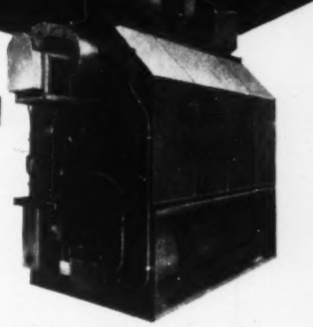
direct-fired HEATER

the "GIBRALTAR"

of
direct-fired
heaters



heavy and light oil fired series

Listed by Underwriters' Laboratories, Inc.
NATIONAL CHAMPION *direct-fired* HEAVY AND LIGHT OIL SERIES HEATERS have met the rigid standards set by Underwriters' Laboratories, Inc. —assurance of safe unit operation!

Twenty-four basic units in the heavy and light oil fired series offer heat capacities from 200,000 to 2,000,000 BTU's!

NATIONAL HEATERS FEATURE *teardrop design stainless steel firebox.*

Designed by National Heater engineers to ensure lower air flow resistance—allows a constant, uniform flow of clean air over the heating unit. Easy to wipe—ensuring better and faster heat distribution!

Heater Construction

Units are of welded one-piece steel construction. Design utilizes to advantage the direct flame-metal-air principle of heat transfer for maximum efficiency.

Burners

Light and heavy oil burners, designed for Nos. 1, 2, 4 and 5 fuels, are pressure gun type. These units are also Listed by Underwriters' Laboratories, Inc. All burners are equipped with patented air adjustment for stable flame and quiet operation with short draft tube to reduce overall unit length. *Electronic flame failure control—standard equipment!*

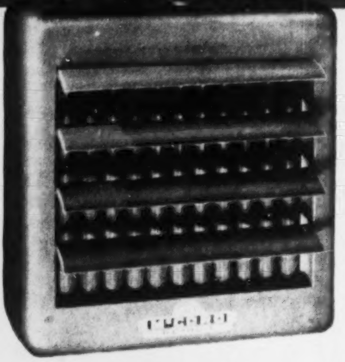
there is a NATIONAL CHAMPION *direct-fired* heater for all HEATING REQUIREMENTS!

Another product of
The NATIONAL HEATER COMPANY
2182 Cleora Avenue, St. Paul 4, Minnesota

for further information on National Champion direct-fired Heaters—write to the above address—Dept. KP-1.

McCORD
HEATING AND
AIR CONDITIONING
PRODUCTS

HORIZONTAL TYPE UNIT HEATERS



Modern design—top performance—thousands in use—dependable heat. All copper coils to resist corrosion — individual tube expansion — most rugged construction — quiet operation — easy installation—standard motors with standard bases. Sizes to 272,000 B.T.U. capacity.

VERTICAL TYPE UNIT HEATERS

A proven heating unit—all copper coils to resist corrosion. McCord spiral tube fin construction creates air turbulence without undue restriction. Improved fan delivers large volume of air, with minimum air noise. All McCord heaters are guaranteed for use with 150 lbs. saturated steam pressure. Sizes to 575,000 B.T.U. capacity.

McCORD CORPORATION
DETROIT 11, MICH.

Institute, public relations department of the National Coal Association. The book contains a comprehensive review of the industry's activities during the past year and features stories of the major mining states. A special 16-page pictorial supplement shows typical scenes of modern mechanized mining operations. Sixty-four statistical tables are included. Publisher is the National Coal Association, 320 Southern Bldg., Washington 5, D.C.

OTHER BOOKS AND REPORTS

STUDIES IN RESPIRATORY PHYSIOLOGY (CHEMISTRY AND MECHANICS OF PULMONARY VENTILATION) — results of an eight year program of research on the phsiological mechanism of human breathing in a technical Air Force report. The report contains 58 papers grouped into four sections: Pressure Breathing, Mechanics of Breathing, Performance at Altitude, and Alveolar Gas Exchange.

The 559-page report is available from the Library of Congress, Photoduplication Section, Washington 25, D. C., on microfilm at $9.00 and photostat at $70. It was published by the Office of Technical Services of the Department of Commerce.

WELFARE FUNDS IN NEW YORK CITY BUILDING TRADES — comprehensive survey of welfare funds in the building trades in New York shows the annual dollar volume of employer contributions and benefits paid. The report was prepared for the Building Trade Employers' Assoc. by its Committee on Welfare Funds, 2 Park Ave., New York 16.

KEYNOTES

"When I Say Key-Tite... I Mean Key-Tite!"

The perfect leak-proof sealer for gasket and pipe joint connections . . . on all lines carrying water, gas, low-pressure steam, etc.

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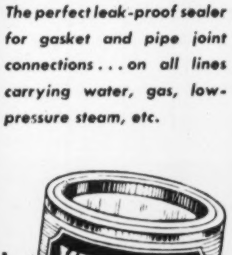
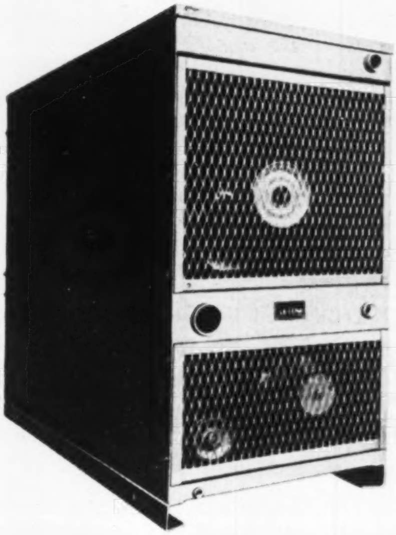


NEW UNITED LO-TEMP SERIES



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3 to 15 Tons Capacity

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Compact . . Durable . . Easily Installed . . Indoors or Out.

Made of 14-Gauge Copper Bearing Steel.

Coated Inside with Rubberized Asphalt.

Available on Short Notice with or Without Water Pump.

Also Package Type Redwood
Spray Towers . . 3 to 30 Tons

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Plant: Pilot Point, Texas

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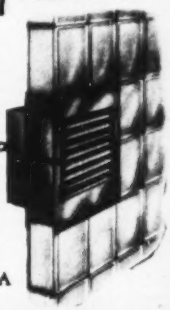
YOUR PLANT WILL **PERK UP** WITH FRESH AIR INSIDE!

and it's so easy with **MUCKLE FRESH AIR INTAKES**

Perk up- fresh up- with F A I- fresh air inside! Get efficiency with economy by installing MUCKLE FRESH AIR INTAKES — they'll supply fresh, filtered air to each room and condition your plant for *top* efficiency without the expense of costly distribution ducts. Muckle Intakes contain inverted v baffels to arrest direct blow through, oiled spun glass filters and adjustable closing louvers on inside.


A

Model A fits easily into glass block construction by removing 4 blocks. Model B fits any wall thickness. Both models have air opening of 10" x 14" and pass 1000 CFM at .0625" static air pressure.

B

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For complete information on Muckle Fresh Air Intakes.

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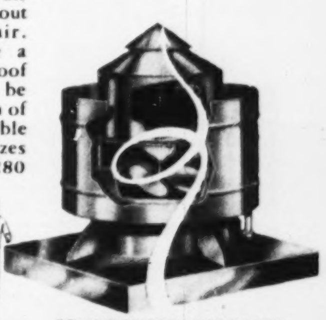
MANUFACTURING CO. OWATONNA, 8 MINNESOTA

IF THE AIR IN YOUR PLANT IS

all fouled up-

MUCKLE VENTS CAN HELP YOU

No problem too tough- whether your air is London Fog thick or Sahara Dry- gaseous or dusty- smoky or hot . . . MUCKLE VENTS remove it quickly and efficiently. These streamlined, propellerdriven, roofmounted ventilators are designed with motor out of the air stream to effectively pull out either wet or dry air. MUCKLE VENTS are a completely weatherproof packaged unit ready to be installed with a minimum of expense and work, available in wide range of 15 sizes from 254 CFM to 10280 CFM.



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Name .... Title ....
Company ....
Address ....
City .... Zone .... State ....

Air Cleaners

HPAC 101—Twelve-page Catalog E-60, on "Electronic Air Cleaners" contains history, principle of operation, aerosol chart, filter test methods, engineering data, equipment photographs and suggested specifications for the air cleaners. [Manufacturer: Trion, Inc., 1000 Island Ave., McKees Rocks, Pa.]

Air Distribution Devices

HPAC 102—Bulletin F 4471-1 describes "Uni-Flo" engineered air distribution products. Described are grilles and registers, various types of ceiling outlets and accessories. [Manufacturer: Barber-Colman Co., 1228 Rock St., Rockford, Ill.]

Air Purifiers

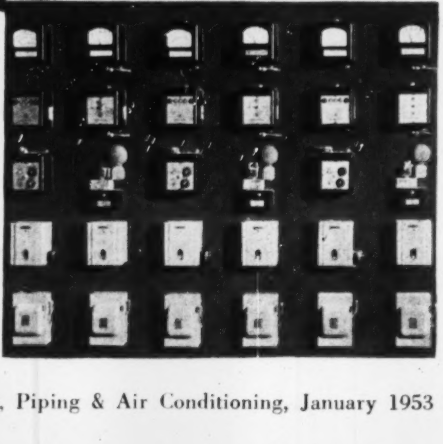
HPAC 103—Bulletin No. 501 describes "Hi-eF" purifiers. The folder describes how mechanical separators clean up steam, vapor, compressed air and gases by removing dirt, solids, moisture, guck and other objectionable entrainment. Also explained is how the separators remove water and oil from gas lines. Installation photos illustrate equipment arrangement and blueprint drawings show piping layouts. Drawings, selection tables, dimensions, capacities and prices are included. [Manufacturer: V. D. Anderson Co., Purifier Div., 1935 W. 96th St., Cleveland 2.]

Baseboard Specifications

HPAC 104—Two types of "National Art Baseboard", which is a replacement for customary wooden baseboard

Military base equipped with Perfex instruments

Panelboard below, with three sets of Perfex Instruments, automatically controls three boilers.



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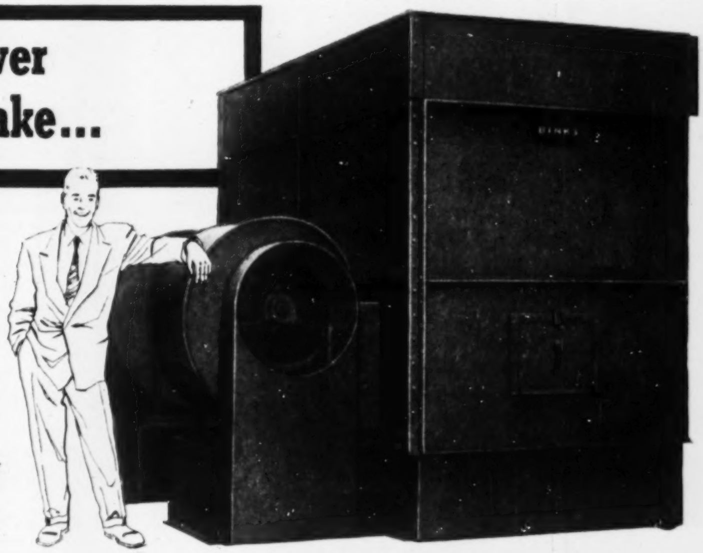
The cooling tower with a dry air intake...



AND SO QUIET YOU CAN HARDLY HEAR IT!

Your operating costs are reduced with Binks Series "B" Cooling Towers because the air propulsion equipment and motors never come in contact with the corrosive moist exhaust air. The dry incoming air passes through the blowers *before* contacting the water distributing system. The counter-current operating principle is also important.

Moreover, Binks Series "B" Towers are noise-free and can be used anywhere—indoors or outdoors. They are ideal for installations where quiet operation is important—for example, hospitals, hotels, apartment buildings, private homes, commercial establishments, etc.

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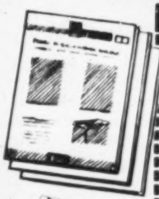

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● You can save money, get extra efficiency when you install Trerice temperature instruments. You'll find a spot for an easy-to-read industrial or dial thermometer on water and refrigeration lines, on hot water tanks, and on air ducts. You can place a quick-acting temperature regulator on a hot water storage heater, on an instantaneous heater, or on an oil preheater. And, for low maintenance costs, you can install a rugged Trerice trap on steam lines. It all adds up to top efficiency in any heating or refrigerating system. Write for a catalog, or information on any item shown.

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Since 1923
Manufacturers of
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and an efficient heating medium, are described and illustrated in Catalog No. 598. "Type BF" is shown as the most conventional type for installation against plaster. It extends 2¼ in. into the room from the plaster wall. "Type BR" is for semi-recessed installation. The baseboard is generally installed in forced hot water heating systems, but minimum lengths can be used with steam. The catalog gives roughing-in dimensions, pictures of baseboard installations, illustrations of trim items such as splicer plates and inside and outside corners, plus complete rating data. [Manufacturer: The National Radiator Co., 221 Central Ave., Johnstown, Pa.]

Boiler Products

HPAC 105—Condensed catalog C-49 and price list covers the company's most popular products. It covers boiler water feeders, low water fuel cut-offs, pump controls and relief valves, including the new temperature relief valves and combination T & P relief valves in both regular and dip tube models. Information is arranged to simplify selection of proper equipment and is complete with prices. Discount sheets have also been published showing contractors' and wholesalers' discounts and net prices on products covered in the catalog. [Manufacturer: McDonnell & Miller, Inc., 3500 N. Spaulding Ave., Chicago 18.]

Carbon Monoxide Detector

HPAC 106—Bulletin 201 describes the functional operation of a detector for CO in physiologically significant concentrations. Included is a diagrammatic drawing of the analyzer, calibrator and recorder. Component parts such as the heater block, analyzer cell, heater control circuit,

for
AIR CONDITIONING
HEATING SYSTEMS
DUST COLLECTING
VENTILATING SYSTEMS
WATER PIPING
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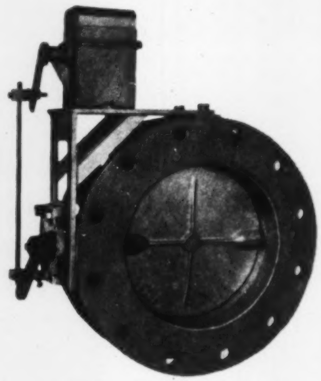
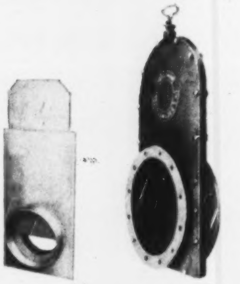
Better Install W. S. ROCKWELL Butterfly or Slide VALVES for Air · Gas Liquids · Solids


Rockwell butterfly valve with electric motor operator; may be equipped with air diaphragm, air or hydraulic cylinder, solenoid, float or other automatic operator, or with lever, handwheel or chainwheel control.

★ Minimum pressure drop—when fully open, valve practically as free as pipe itself.
★ Uniform, quick control manually or automatically.
★ Positive shutoff—commercial, drip tight or air tight.
★ Pressures—slide valves to 100 p.s.i.; butterfly valves to 600 p.s.i. Temperature range—from below zero to 2000° F.
★ Made of any metal or rubber lined.
★ Sizes—1" to 72" and larger.


Rockwell slide valve with pull handle control; available also with lever handwheel, chainwheel or air cylinder control. At left—a simple slide valve of sheet steel or aluminum.

ROCKWELL
Valves
Write for this Catalog

W. S. ROCKWELL COMPANY
2542 ELIOT STREET • FAIRFIELD, CONN.

THE

NEW ALDRICH *Gulf Stream* C-SERIES BOILER-BURNERS

The Gulf Stream
STANDARD

Shipped fully erected, with complete set of automatic controls: stack switch, thermostat and limit control.

Designed, Sized, Rated and Priced For Today's Low-Cost Housing Market

Aldrich produced this new line to meet today's urgent need: quality boiler-burners at a quantity price. Here is compact hot water heating with a saving of dollars, critical materials, space and installation time.

They meet the ASME code; they are designed for standardized production. Five separate sizes, with SBI net ratings ranging from 440 to 1120 square feet of water radiation.

Investigate this new line today. You'll find it profitable to sell, easy to install, economical to use.

HOT WATER HEATERS

Available as internally galvanized, high-delivery hot water heater. Five sizes, with output from 100 to 255 GPH at 100° rise. Instant, steady supply of hot water for larger homes, motels, commercial units.

FEATURES

Multiple flue tubes baffled for maximum heat extraction

High combustion efficiency

Fast action

Instant hot water from tankless hot water coil

Aldrich burners coordinated to Gulf Stream boilers

For inspection and maintenance — readily removable top jacket and large opening to combustion chamber

Burners U.L. listed

The Gulf Stream
PACKAGE

Fully erected package, pre-wired, accessory equipped, ready to set in place and connect.

For full details, write or wire

ANOTHER
BREEZE MARK
PRODUCT

ALDRICH
COMPANY
Wyoming, Illinois

SEE THE GULF STREAM AND COMPLETE ALDRICH LINE AT THE ASHVE SHOW, CHICAGO, WEEK OF JAN. 26

Designed and engineered

for proper depth of corrugation

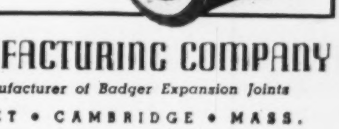
Badger Expansion Joints

Experience has proven that longer expansion joint life can only be safely assured by varying the depth of corrugation with relation to size and traverse per corrugation. In the regular practice of precision manufacture and engineering Badger Manufacturing Company has established standards for different diameters. *Not just a shallow and a deep corrugation, but precisely the accurate depth of corrugation needed.* Just one of the many important characteristics and reasons you should specify Badger Expansion Joints.

D-F S-E Directed-Flexing Self-Equalizing: an exclusive feature of Badger Expansion Joints. The flexing of the corrugations is progressively directed over each segment of each of the all-curve corrugations by correspondingly shaped self-equalizing rings. Localized stresses are eliminated insuring a more flexible longer lasting joint.

Buy Badger Joints and you get flexibility. D-F S-E and these features:

- Packless . . . pressure tight single tube — requires no maintenance
- Compact . . . approximately the size of flanged fitting
- Special forming . . . no structure-weakening stresses
- Controlled heat treating . . . assures long life
- Wide range of traverse — pressure — temperature Fabricated from deoxidized copper, stainless steel and special alloys to meet various operating conditions.

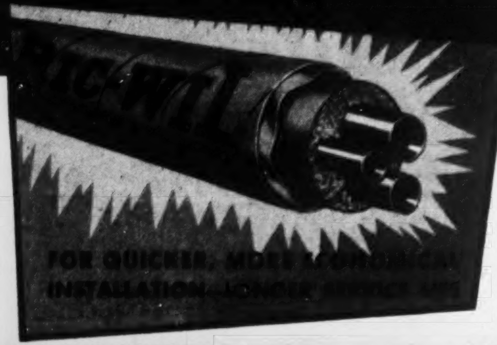


BADGER MANUFACTURING COMPANY

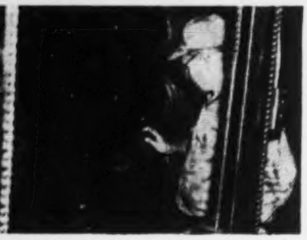
Original and Sole Manufacturer of Badger Expansion Joints

230 BENT STREET • CAMBRIDGE • MASS.

THE BEST ENGINEERING SPECIFICATION FOR INSULATED PIPE LINES

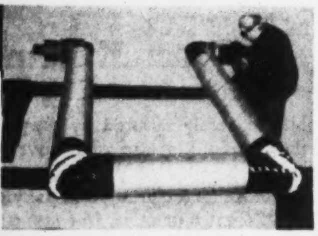

RIC-WIL
FOR QUICKER, MORE ECONOMICAL INSTALLATION, LONGER SERVICE LIFE

COMPLETE PROTECTION



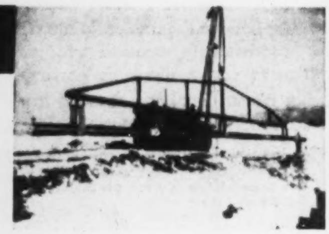
Ric-wiL HEL-COR Units are designed for severe service conditions. The strong, shock-proof housing is 16-gauge Armco ingot iron, spirally-corrugated, hot-dipped galvanized, and rust-proofed "Bonderized." Outside is given a 1/8" thick covering of high-melting point asphalt and asbestos felt, and inside coated with phenolic resin, baked-on — a multiple layer of protection against moisture and corrosion.

CERTIFIED WELDING



Built by skilled craftsmen, all Ric-wiL systems are designed and welded to comply with the requirements of the A. S. M. E. Code for Pressure Piping, and we are authorized to apply the appropriate Code symbols. Piping and conduit are rigidly inspected and tested before leaving our factory — your assurance of trouble-free piping performance.

PREFABRICATED UNITS



All parts and fittings, including complete expansion loops or packless-type joints, are delivered to job site in easily-handled units of sound engineering design — eliminating many installation steps entirely and lowering final costs. These versatile units may be safely installed under city streets, railroad tracks, or suspended overhead.

Ric-wiL Systems range in size from 6" conduits to giant 84" diameter Utilidors designed to carry all utility services. Put Ric-wiL's broad experience to work for you — ask us for latest literature or discuss your next piping project with a Ric-wiL representative.

THE RIC-WIL COMPANY
Mfgrs. Insulated Piping and Conduit Systems
UNION COMMERCE BLDG. • CLEVELAND, OHIO

LEADERS IN INSULATED PIPING PROTECTION

air filtering system and pump and motor are described. Specifications of analyzer sensitivity, accuracy, range and dimensions are given. [Manufacturer: Taller & Cooper, Inc., 78 Front St., Brooklyn 1.]

Coil Flusher

HPAC 107—Folder, "Coil Flushing Facts" describes "Dri-Sol Gun" and "Dri-Sol Solvent" for use in cleaning refrigerant lines and coils under pressures. Specifications for the use and results of these two products are included. [Manufacturer: Ansul Chemical Co., Refrigeration Div., Marinette, Wis.]

Corrosion-Resistant Coatings

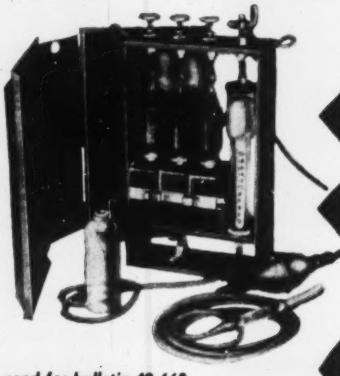
HPAC 108—Bulletin 730 gives a full description of "Tygon Point" and "Tygorust," a vinyl primer. The 16-page, illustrated booklet tells where and where not, how, and how not to use the corrosion-resistant paint and primer. Comprehensive chemical-resistance charts, and an extensive chart on recommended primers and surface treatments are given. [Manufacturer: U. S. Stoneware Co., Akron 9, Ohio.]

Dampers and Damper Operators

HPAC 109—Catalog 8502 describes louver, round, mixing, outlet and fire dampers for regulation of air flow in industrial applications, also electric, pneumatic and manual damper operators. The booklet includes application data, velocity-pressure drop charts and damper ratings for electric and pneumatic operators. [Manufacturer: Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Station 213, Wayne and Windrim Aves., Philadelphia 44.]

Analyze for CO, CO_2, O_2 with one instrument

HAYS ORSAT GAS ANALYZER



Complete—3 absorption units provide complete gas analysis for all the operating engineer's needs.

Rugged—built for continuous field use . . . strong, pressed steel construction.

Portable—contains everything you need to make a complete analysis . . . in one easy-to-carry case. Compact, yet all parts are easily accessible.

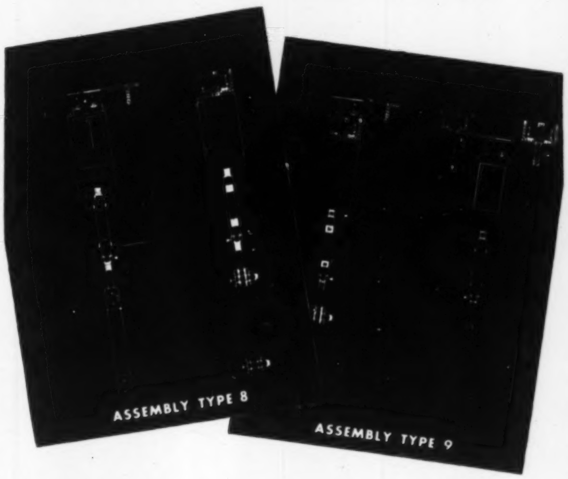
send for bulletin 49-668
for complete description of all styles.

The Hays Orsat Type Gas Analyzer is simple, fast, and employs the most reliable method known for obtaining accurate measurement. Available in one, two or three-unit styles (illustrated).

THE HAYS CORPORATION
MICHIGAN CITY 14, INDIANA
combustion and industrial instruments and control

HOLD EVERYTHING ...with

BLAW-KNOX OVERHEAD ROLLER ASSEMBLIES



These *new, improved* Multiple Rolling Action Hanger Assemblies were engineered to supply the demand for a standard, low-cost balanced roller attachment to structure. When combined with Blaw-Knox Functional Hangers these assemblies allow vertical, longitudinal and horizontal movements within defined limits. Made in all standard sizes, and designed to accommodate operating loads up to 12,000 lbs.

BLAW-KNOX
ADJUSTABLE PIPE HANGERS
VIBRATION ELIMINATORS
AND SUPPORTS

Power Piping

CATALOG NO. 51 brings you complete information on Blaw-Knox Pipe Hangers, Vibration Eliminators and Supports. Write for your copy today.

BLAW-KNOX COMPANY
Power Piping and Sprinkler Division
Pittsburgh 33, Pa.

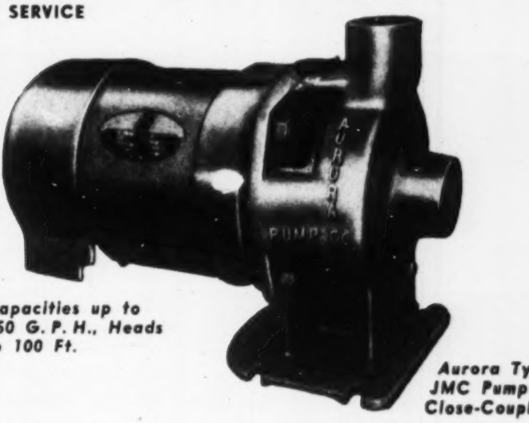
They SELL! They PLEASE! AURORA CLOSE-COUPLED *Packaged*

AIR CONDITIONING PUMPS

for
EVAPORATOR COOLING TOWERS
•
AIR CONDITIONING UNITS
•
also for
GENERAL SERVICE

These are outstanding pumps, high in favor with air conditioning contractors and manufacturers of air conditioning equipment. Mechanical seal requires no packing or maintenance. Disassembly without disturbing pipe connections or hold down bolts.

- **LOW COST**
- **SMOOTH, QUIET**
- **DEPENDABLE**
- **LONG LIVED**
- **MECHANICAL SEAL**
- **DISASSEMBLY is QUICK, SIMPLE**
- **CARRIED IN STOCK**



Capacities up to 150 G. P. H., Heads to 100 Ft.

Aurora Type JMC Pump — Close-Coupled

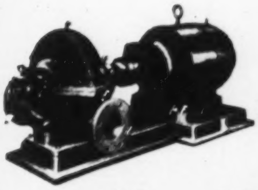
CASINGS vertically split. Casing wearing ring standard.

MECHANICAL SEAL—standard, located in packing cover.

IMPELLER — balanced, enclosed type, high grade bronze.

MOTOR—NEMA specs., stainless steel shaft on JMC — for all circuits and various enclosures.

BALL BEARINGS — on JMC, built into motor.



OTHER AURORA AIR CONDITIONING UNITS

We are also in a position to supply various sizes of air conditioning pumps in V-Belt drive, and flexible coupling drive. Our large size type G.M.C. Close-Coupled Pumps can be furnished up to 800 G. P. M. and heads to 200 ft.

ALSO — AURORA SPLIT CASE CENTRIFUGAL PUMPS

— single and two stage for water supply, handling condenser circulating water, brine circulation, booster service and many other duties.

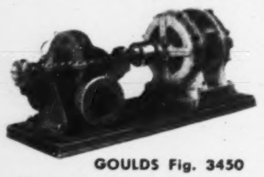
Complete Information on Request

DISTRIBUTORS IN PRINCIPAL CITIES

AURORA *Always* PUMPS

AURORA PUMP COMPANY
SUBSIDIARY OF THE NEW YORK AIR BRAKE CO.
80 Loucks Street
Aurora, Illinois

Keep costs DOWN... efficiency UP with this Single-Stage Centrifugal Pump



GOULDS Fig. 3450
Horizontally split and bolted glands provide easy access for repacking.

For: Circulating and Booster Service

If you are looking for economy plus efficiency, it will pay you to specify Goulds Fig. 3450 Single-Stage Centrifugal Pumps. These low-cost pumps offer high-efficiency service with relatively low power consumption. Their simple, sturdy construction assures long life and low maintenance. Capacities to 15,000 G.P.M. Heads to 500 ft. Write for Bulletins 721.1 and 721.2.

Goulds PUMPS INC.
Seneca Falls
New York

Electric Heaters

HPAC 110—Catalog D-52 contains description and illustrations of electrical comfort heater showing type, size and rating. The 8-page catalog list 75 different models of forced air, convection and radiant heaters in capacities of ¼ to 100 kw. [Manufacturer: Edwin L. Wiegand Co., 7610 Thomas Blvd., Pittsburgh 8.]

Explosion-Proof Motors

HPAC 111—Bulletin 1784 includes complete information on a totally-enclosed explosion-proof motor. Photographs and detailed descriptions are given for the various models for hazardous services and non-hazardous services. A large cut-away diagram in four colors shows the operation and special features of the motor. [Manufacturer: U. S. Electrical Motors, Inc., P. O. Box 2058, Los Angeles 54.]

Finned-Tube Radiation

HPAC 112—Catalog 625 describes "Linovector" radiation. It includes instructions for all types of commercial installations with complete I-B-R ratings for fin-tube radiation. Comprehensive pipe sizing tables for hot water or steam heating systems including series loop are given. Also included are dimensional data on enclosures, hangers, support brackets, joining pieces and manually operated dampers for style "C.S." Shipping weights are shown. [Manufacturer: The Vulcan Radiator Co., 26 Francis Ave., Hartford 2, Conn.]

Flexible Tubing

HPAC 113—Flexible tubing for ventilation, fume and

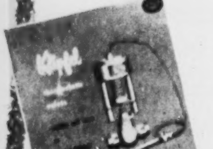
for temperature, pressure, liquid level control . . .

Choose Klipfel valves

#148—Reducing Valves

#349—Float Valves

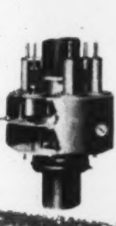
For dependability and economy . . . whether for plant equipment or manufactured products . . . specify Klipfel Valves . . . a wide range of standard types, as illustrated below, or controls designed specifically for you. If you have a control problem, discuss it with Klipfel Engineers. Write for the latest Klipfel Valve bulletins shown here, each contains valuable, easy-to-use selection and specifying data. Address Dept. S-1.

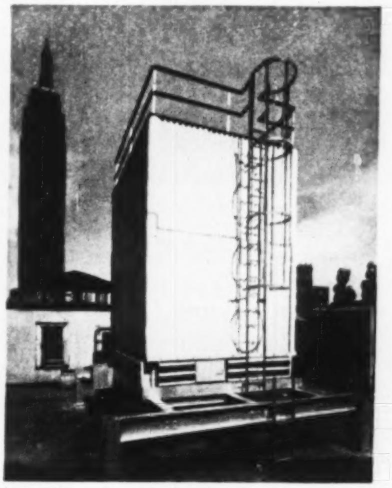


#449—Thermostatic Valves

#135M—Multiport Back Pressure Valves

Klipfel VALVES INCORPORATED
HAMILTON, OHIO





When in the market for a cooling tower which will be dry during the winter months call upon the Phillips Cooling Tower Co. Inc.

Towers of wood dry out when not in use and become dangerous fire hazards.

Towers of steel corrode and deteriorate rapidly increasing maintenance costs.

For many years the Phillips Cooling Tower Co. Inc. has specialized in corrosion resistant construction.

Phillips cement asbestos towers are the answer to the corrosion problem. Now available in all sizes including the smallest package units.

Ask for Bulletins PC-207, 208 and 209.

Phillips
Cooling Tower Co., Inc.
220 DUPONT ST., BROOKLYN 22, N. Y.

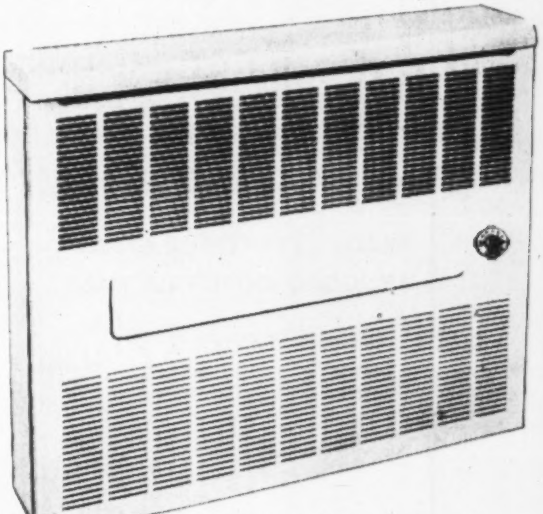
CIRCLE-AIR CONVECTION ELECTRIC HEATING

SOLVES these heating **PROBLEMS** in your plant...

For "cold" rooms or offices, **CIRCLE AIR** gives **thermostatically controlled** spot heat **where** and **when** needed.

Ideal for off-season heating. **CIRCLE AIR** heats offices when heat is unwanted in plant. No need to work entire heating system.

CIRCLE AIR eliminates dirt collecting, smelly gas space heaters. No odors, no noise, no drafts, no fans with **CIRCLE AIR.** It's healthy, **natural** convection heat.



Installation is simple, low cost. No pipes, boilers, furnaces.

Maintenance cost is negligible. Heating unit is **guaranteed** for five years.

CIRCLE AIR Convection Electric Heating is the ideal answer to your most bothersome heating problems. Its superior design, high efficiency, and low cost of operation make CIRCLE AIR a must in your plant. Comes in five sizes, from 700 to 2800 Watts, with or without built in Robertshaw thermostat. Also portable models with built in thermostat. Write for Free Booklet.

Dealers Inquiries Invited

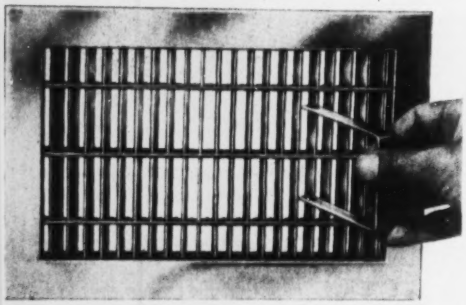
Paley MANUFACTURING CORPORATION
244 Herkimer Street, Brooklyn 16, N. Y

IN OUR SCHOOLS
REGISTERS and GRILLES
MUST BE
*Tamperproof
*Kickproof

Specify

R & G Solid Bars with Interlocking Cross Bars
(Fixed or Adjustable)

**FAULTLESS OPERATION*
**RUGGED CONSTRUCTION*


R & G Style 120 Chrome plated

Complete Line of Registers and Grilles for
HEATING · VENTILATING · AIR CONDITIONING
Catalog on Request

REGISTER & GRILLE MFG. CO., INC.
70 BERRY STREET, BROOKLYN 11, N. Y.

dust removal, and materials handling is described in 8-page bulletin C2-4. "Spiratube A" and "Spiratube B", helical coils of spring wire wound with overlapping plies of specially treated multi-coated fabric, are described. The catalog contains detailed specifications, air friction charts, data on oil and chemical resistance and application information. [Manufacturer: Flexible Tubing Co., Guilford, Conn.]

Hot Water Safety

HPAC 114—Booklet, "52 Questions and their Answers," gives information on causes of explosions in hot water tanks, the effect of temperature and pressure and safety measures. [Publisher: Watts Regulator Co., 10 Embankment St., Lawrence, Mass.]

Multi-Circuit Float Controls

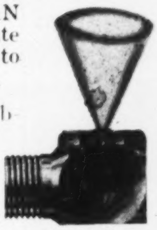
HPAC 115—Bulletin 3500 covers "Type M Autocon Selectrols" which are used for water, sewage, irrigation and flood control systems. According to the manufacturer, one float can provide a coordinated operation of 2 to 18, or more, pumps, valves, etc. Typical operating schedules, installation plans and a selector chart showing dimensions and specifications are included. [Manufacturer: Automatic Control Co., 1005 University Ave., St. Paul 4.]

Pipe Repair Clamps

HPAC 116—Illustrated folder, "Stop Leaks," describes pipe repair clamps for repairs of leaks, blow-outs and short splits in all types of pipe. Specifications of the band, lug, bolt and gasket are included. A description also is given of the company's "Superior" clamp for high pressure lines. [Manufacturer: Adams Pipe Repair Products, 2453 Merced Ave., P. O. Box 21, El Monte, Calif.]

DELAVAN SPRAY NOZZLES
FOR UNUSUAL APPLICATIONS

Type WD


Type WR

There is a DELAVAN NOZZLE for any flow rate from 2 quarts per hour to 63 gallons per minute.

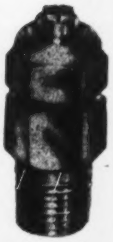
Type WD — ideal for obtaining finest possible pressure atomization.

Type WS — available for either full or hollow cone spray. Excellent for a wide variety of special applications.

Type WR — a right angle nozzle producing hollow cone spray similar to Type WS.

Type AG — delivers flat uniform spray without concentration at edges. Drifting reduced to minimum.

Type WS


Type AG

Write for Catalog No. 31

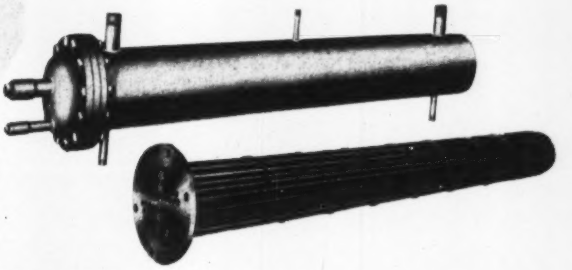
DELAVAN MANUFACTURING CO.
3009 SIXTH AVENUE
DES MOINES 13, IOWA

BETTER COOLING WITH

Taco

"CONTROLLED VELOCITY" CHILLERS

1. Improved heat transfer
2. Rapid response to Thermal Expansion Valve
3. No oil logging and slop over



Because . . .

TACO'S "CONTROLLED VELOCITY" TUBE BUNDLES

Carry *all* incoming liquid to the top of the Chiller in the first pass.

Provide constant forward movement of *all* refrigerant and oil.

Prevent accumulation of liquid (refrigerant or oil) in any part of the Chiller.

And because . . .

TACO'S "CONTROLLED VELOCITY" HEADS . . .

Agitate oil and liquid refrigerant, at each head pass, with a constant stream of expanding gas.

Provide unretarded flow of refrigerant.

Eliminate "traps" for oil and liquid refrigerant

For full information and Taco's "pin-point" Selection Charts, write for Bulletin CWF.

Taco

TACO HEATERS INCORPORATED
137 South Street Providence 3, R. I.

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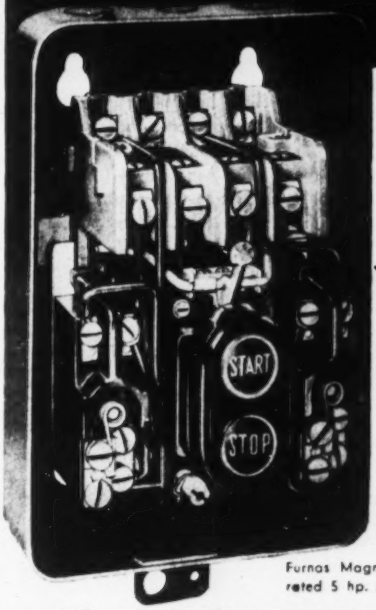
5 Reasons FOR DEMANDING FURNAS MAGNETIC STARTERS



Furnas Magnetic Starter
rated 5 hp. 220v: 7½ hp. 550v AC

1. **ARC-QUENCHING SILVER CONTACTS—** Rigidly tested and selected for low contact resistance, best arc-quenching properties.
2. **ARC-RESISTANT TERMINAL BOARD—** Molded of plastic selected for non-tracking properties. . . . *fungus-proof Plaskon alkyd.*
3. **DUAL VOLTAGE COILS—** Furnished in both polyphase and single phase starters. . . . *supplied at no extra cost.*
4. **POSITIVE ACTING THERMAL OVERLOAD UNITS—** of solder-pot type automatically protect motor from overheating.
5. **SHALLOW CASE FOR EASY WIRING—** and good visibility.

Furnas magnetic starters and contactors are available in sizes up to 10 hp. with or without push buttons or selector switch . . . 1041 McKee Street, Batavia, Illinois.

FURNAS

Electric MOTOR CONTROLS

ADJUSTABILITY is the answer!

To carry a wrench for every pipe size would be costly and practically impossible. Especially when several adjustable pipe wrenches will take care of most of your needs. That's the sensible answer to a very ordinary problem.

HERE TOO!

4200 Series
Cast Iron Tank

Sterlco CONDENSATION PUMPS

√ EASY to SELECT √ CONVENIENT to STOCK

Yes, only two sizes are required to take care of all jobs up to 15,000 sq. ft. EDR . . . and up to 20 lbs. discharge pressure. The adjustable float switch — so simple to set at required position — plus other Sterlco features make this possible . . . and only possible with a Sterlco Pump.

For you . . . this means less working capital tied up in floor stock. For your customers . . . this means that a future increase of radiation may not necessitate the installation of a new pump.

Combine this exclusive Sterlco feature with overall rugged construction and low cost and you find the reason Sterlco PUMPS are first choice of the industry. Yes, Sterlco will always do a better job . . . longer! Send for complete information on Sterlco Pumps.

Sterlco 4100 series for jobs where steel tank is preferred — same features as 4200 series.

STERLING, INC.

3732 N. Holton St., Milwaukee 12, Wisconsin

CONDENSATION AND VACUUM PUMPS

HEATING SPECIALTIES

TEMPERATURE CONTROLS

Plastic Pipe

HPAC 117—Sixteen-page brochure contains information on the company's four types of plastic pipe: "Flexible," "Semi-Rigid," "Rigid High Impact," and "Rigid Polyvinyl Chloride Pipe." Detailed tables give chemical and physical characteristics of each type. Also included are a discussion of the advantages of plastic pipe, applications and directions on how to install and join the pipe. [Manufacturer: Triangle Conduit and Cable Co., Inc., Plastic Products Div., New Brunswick, N. J.]

Portable Drill Attachment

HPAC 118—Data sheet describes "Guide-A-Drill' to give an accurate perpendicular or angular hole. A circular level shows the operator the exact vertical position of the drill and the contact head shows the horizontal position of the drill in relation to the work. [Manufacturer: The Roy Silver Corp., 561 Bridgeport Ave., (Boston Post Rd.) Devon, Conn.]

Precipitator

HPAC 119—Four-page bulletin contains information on the design features of the "Cottrell" electrostatic precipitator for the paper industry. The wet-bottom design also is explained. Diagrams and cut-away views of the equipment show operating and construction details. [Manufacturer: Research Corporation, Bound Brook, N. J.]

Pump Manual

HPAC 120—Application Manual 2495, covers special purpose pumps and related products. Subjects discussed are centrifugal pumps, airline pumps, unassembled con-

Beckon to Beck for

FAST DELIVERY OF

SPECIAL-SIZE

AMER-glas

AIR FILTERS

Our product: AMER-glas Air Filters. Our specialty: fast delivery of special sizes. Our special pride: complete satisfaction whether you order regular or special sizes.

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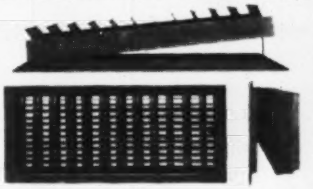
315 W. MAIN STREET • NEW ALBANY, IND. • PHONE 4-1561

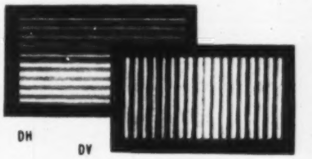
when in the dark...
Look to
Stewart
for Outstanding New Advances in
Air Conditioning Outlets

REGISTERS
GRILLES
SCOOPS
by
Stewart

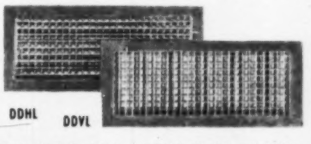
In this Complete Catalog...

For Quality, Originality, Economy and Fast Delivery—your best choice is Stewart for Industrial and Commercial Registers — Grilles and Air Controls. You'll find one to suit your every need in the new 28 page Catalog #53.


SCOOPMASTER
Eliminates sheet metal collar—directs and controls air

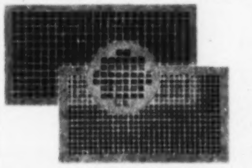


SINGLE BANK OUTLET



Triple Bank Registers Individually Adjustable Fins

Opposed-Action Valves
optional with all Supply and Return Air Registers.


PLAIN LATTICE GRILLES

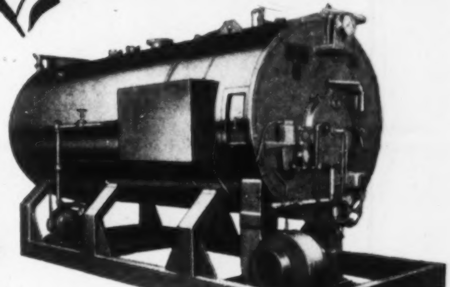
SCOOPTROL
Deflects and controls the air from a supply duct into a collar

Stewart
MANUFACTURING CO., INC.
Grove Ave., Essex County, Cedar Grove, N. J.

2241

Representatives in the Principal Cities of United States, Canada and the West Indies.

No Annoying "Extras"
IT'S READY TO INSTALL
AND START MAKING
Low-Cost Steam!



20 SIZES...
10 to 600 h.p...
15 to 200# OIL OR GAS

AMESTEAM GENERATOR

This automatically controlled packaged boiler unit includes:

★ all piping and wiring, ready for your service connections.

★ fan, feed water pump, condensate tank, injector, blow-off valve, necessary refractories, insulation and metal jacket.

ALL YOU NEED is fuel tank, gas vent and service connections.

—AND YOU KEEP RIGHT ON SAVING with these trouble-free, fully automatic units with their eye-level controls, their accessibility inside and out, and fuel-saving 80% guaranteed efficiency!

AMESTEAM
AMES

FOR FACTS ON LOWER COST STEAM
WRITE FOR THIS FREE BULLETIN NOW!

NAME
COMPANY
ADDRESS

AMES IRON WORKS

BOX D-13 OSWEGO, N. Y.

Builders of Better Boilers Since 1848

Fans
SOUTH BEND
SOUTH BEND AIR PRODUCTS INC
INDIANA
FOR EVERY Industry

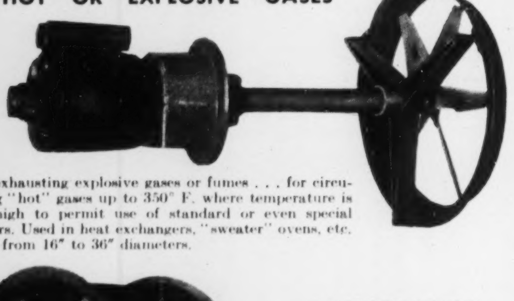
AEROSPOT
and
DYNAFLOW

Aerospot and *Dynaflow* fans rate high in efficiency and safety features . . . offer advanced aerodynamic design and rugged construction. The models shown enjoy wide popularity with industrial users. Any unit may be furnished with **explosion-proof** motor and fan blades.

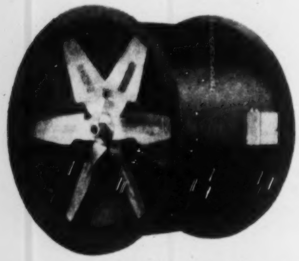
HEAVY DUTY AEROSPOT
For general or specific ventilation, man-cooling, or parts-cooling . . . to increase personnel efficiency and reduce lost time in cooling and drying hot parts. Portable . . . direction of blast adjustable. Explosion-proof motor, metal conduit and starter can be supplied. Conforms to state safety regulations.

DYNAFLOW UNITS 2-4-6 BLADE TYPES
Six blade model illustrated. For exhausting or blowing against high static pressures. For general ventilation or specific processes where fumes are present. Sizes: 16" to 36" diameter. Capacities: 1240 to 26000 c.f.m. Two and four blade models available for applications at lower static pressures.

EXTENSION ARM DYNAFLOW FOR "HOT" OR "EXPLOSIVE" GASES



For exhausting explosive gases or fumes . . . for circulating "hot" gases up to 350° F. where temperature is too high to permit use of standard or even special motors. Used in heat exchangers, "sweater" ovens, etc. Fans from 16" to 36" diameters.



DUCTYPE UNITS
Direct Drive or Belt Drive
Direct drive model shown, also supplied with belt drive for high temperatures or corrosive air and gas handling. Designed for bolting in any duct run at any point or at either end. Sizes: 16" to 36" fans.

Send for complete specifications and listings of other fans available.

WRITE FOR CATALOG

SOUTH BEND AIR PRODUCTS, Inc.
322 EAST COLFAX AVENUE • SOUTH BEND 22, INDIANA

densation pumps, flash tanks, lift fittings, vacuum breakers and check valves. The bulletin is a supplement to the Heating Products Catalog and is designed to serve as a guide for those who specify, sell and install this type of heating equipment. [Manufacturer: C. A. Dunham Co., 400 W. Madison St., Chicago 6.]

Recorders and Indicators

HPAC 121—Catalog 1520 contains information concerning "ElectroniK" non-control precision instruments which employ a potentiometer or other measuring circuit to measure temperature, pressure, flow, pH and other variables. This literature presents detailed specifications for each particular model and includes information on special instruments such as the "Electrometer," "Function Plotter," "Scanning System," "TV Dial Recorder," "Double Range Precision Indicator," and "Console Deck Precision Indicator." [Manufacturer: Minneapolis-Honeywell Regulator Co., Brown Instruments Div., Station 64, Wayne and Windrim Aves., Philadelphia 44.]

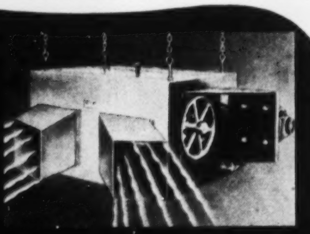
Registers, Grilles and Scoops

HPAC 122—Catalog 53 contains illustrations, specifications and engineering data on the company's complete line of registers, grilles and scoops. Some of the products covered include exhaust and relief grilles, closed space registers and grilles, air controls and frames. A detailed selector chart is included in addition to several tables showing list prices. [Manufacturer: Stewart Mfg. Co., Inc., Grove Ave., Cedar Grove, N. J.]

Steam Trap

HPAC 123—Bulletin 351 is a data sheet covering the new "Type D" industrial steam trap. A thermostatic bel-

HERE'S YOUR ANSWER TO LARGE AREA SPACE HEATING!



CHROMALOX
Blower Type
UNIT HEATERS

FOR HEAVY-DUTY HEATING IN FACTORIES, WAREHOUSES, OFFICES
Ceiling mounted CHROMALOX Electric Blower-Type Heaters are your quick, easy answer to space heating! Twin centrifugal fans, driven by a 3-phase motor, distribute warmth evenly over large areas. Air ducts can be used to convey heated air to desired locations. Automatic thermal cutout assures protection against overheating. 51,180 to 136,480 BTU output per hour.

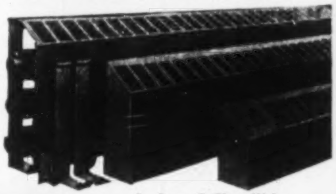
HAVE A HEATING PROBLEM OF ANY KIND?
Then write for Catalog 50. It's loaded with information on many of the 15,000 types, sizes and ratings of Chromalox Heating Units and Equipment.

Industrial Div., EDWIN L. WIEGAND CO., 7610 THOMAS BLVD., PITTSBURGH 8, PA.
CHROMALOX
IB-8
ELECTRIC HEAT FOR MODERN INDUSTRY

For Modernization or New Construction

Basevector

WARM WALL HEATING AT ITS BEST



Economy, attractive design, higher and faster heat transfer as well as noiseless operation make Basevector the best in industrial and commercial perimeter radiation. Expanded metal enclosures are available. Your opportunity to offer Warm Wall heating at its best.

WRITE FOR COMPLETE DETAILS AND RATINGS

1, 2, or 3 Tiers High
In addition to Basevector our regular Baseline Baseboard Radiation is saving money every day for heating contractors. BASELINE THE BESTLINE

Baseline Mfg Corp
3117 NORTH WASHINGTON AVE.
MINNEAPOLIS 11, MINN

for

SPECIFICATION

and

BUYING INFORMATION

Use your complete, up-to-date

JANUARY DIRECTORY ISSUE

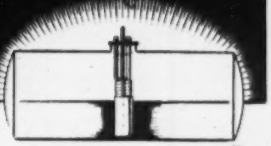
Your job will be a lot easier if you'll keep the January Directory issue of Heating, Piping & Air Conditioning constantly available for handy reference. It's one of your most valuable tools — one which will save you many hours of looking up the products you need for your various jobs. It's the ONE complete, up-to-date, readily accessible source of product information on who makes the pumps, valves, traps, compressors, specialties of all kinds, etc., you need — and where they're located. They're indentified by trade names, too. EVERY product is listed, alphabetically arranged and printed on a distinctive yellow stock for easy reading and reference.

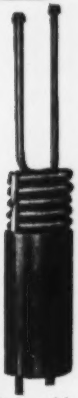
Keep it handy . . . the time you save with it can be used to advantage in other ways.

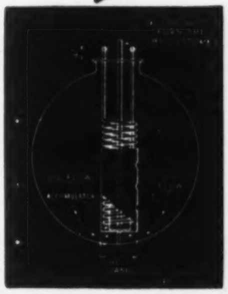
HEATING, PIPING & AIR CONDITIONING
6 North Michigan Ave. Chicago 2, Ill.

Solve **STORAGE TANK OIL PREHEATING**

REMPE "Hot Spot" PREHEATER







All-steel shell and coil assembly for preheating No. 5 and Bunker "C" oils and other liquids to proper flow temperature before they enter the suction pipe. Positive preheating by flow accumulator.

Suction pipe, inlet and outlet pipes for heating by steam or hot water go through manhole cover. Made with 14" or 16" dia. shell.

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Complete facilities for fabrication of pipe coils — all types — all materials. Engineering service. Send details for price.

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AT LOWER COST

Trindl "CONSTELLATION" LINE **ARC WELDERS**

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Heating and Air Conditioning men, here is the equipment to handle speedy construction, installation and maintenance jobs with perfection and simplicity.
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Shipped complete including insulated operating accessories.

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A Trimount Manometer
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remember final control is the SPRAY NOZZLE you use!

In design . . . choose the Spray Nozzles that give you proper performance, with exact spray pattern, impact, spray angle and capacity. In application . . . be sure the nozzles as supplied are produced to close tolerances. Metallurgically, make certain the spray nozzles fit your use.

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3219 RANDOLPH STREET • BELLWOOD, ILLINOIS

FOR EFFICIENT SPRAYING MAKE SURE THE NOZZLE IS RIGHT

lows steam trap, it is smaller in size and capacity than other types made by the company. Applications, construction and operation, list prices and a table showing the maximum capacity in lb per hr at various pressures are included. [Manufacturer: W. H. Nicholson & Co., 12 Oregon St., Wilkes-Barre, Pa.]

Steel Selection

HPAC 124—"Guide to Steel Selection," covers in condensed form the characteristics, mechanical properties and uses of a comprehensive list of hot rolled and cold finished carbon and alloy steel bars. The bulletin is designed to make comparisons of the different types and serves as a guide for the selection of the most suitable qualities of bar steel for the jobs that come up in the average shop. [Publisher: Joseph T. Ryerson & Son, Inc., Box 8000-A, Chicago 80.]

Telemetering

HPAC 125—Semi-monthly publication, "Autocon Rambler," covers telemetering in a special edition. It defines telemetering, outlines some typical applications and enlarges on systems for water and sewage applications. [Publisher: Automatic Control Co., 1005 University Ave., St. Paul 4.]

Tool Catalog

HPAC 126—Catalog No. 66-1952 replaces No. 63-D now in use. The 24-page catalog, well illustrated, contains a list of decimal equivalents and data on 82 models of pliers, regular and custom-built, adjustable wrenches and full descriptions of 10 displays. A special feature of the book is the diagramming of the tool jaws with their accur-

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Here is a standard diaphragm regulator that can handle your *special* pressure control requirements. It is furnished in a wide range of sizes, types (self-contained, instrument or pilot control), bodies, and trim, to your specification. For water, oil, steam, air or gas. No. 119 single seated, No. 114 double seated, sizes ½" to 6", screwed, standard or extra heavy flanged. Direct or reverse acting. Tested and approved by leading engineers and contractors—the answer to your regulator problems.

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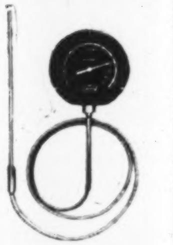
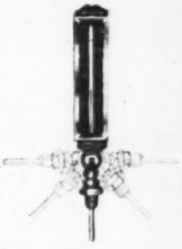


Pressure Gauge

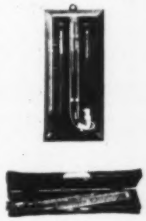


Adjust-Angle

Portable Recorder

Recording Thermometer

Hygrometer & Psychrometer



Send for Catalogues and Literature
Catalogue #125 Industrial Thermometers and Hygrometers
Catalogue #225 Glass Engraved Stem Thermometers and Hydrometers
Catalogue #325 Dial Indicating and Recording Thermometers
Catalogue #525 Dial Indicating and Recording Pressure Gauges
Bulletin AA50 Facts on the Revolutionary Adjust-Angle Thermometers

Radiant panels in lobby and sidewalks of ultra-modern Alcoa Bldg., Pittsburgh, used Heatcrete.

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(Densifier for plastic masses)

Makes Thinner Stronger Radiant Panels

Increases Thermal Conductivity

Heatcrete is a high thermal-conductivity aggregate added to concrete (& other plastic mixes) to increase density and heat conductivity of the mass.

Panels made with it reduce weight and increase rapidity of response to heat source. Such panels require 25-30% less piping and installation expense, and give lower operating cost. For details, write:

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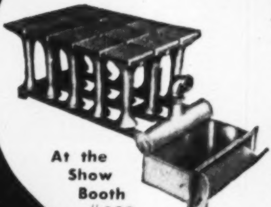

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Model 700 series Industrial

The Reinhard line includes:

Industrial gas conversion units that will fit practically any installation requiring from 60,000 to 3,000,000 BTU input . . .

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Domestic conversion units for practically all types of home heating.

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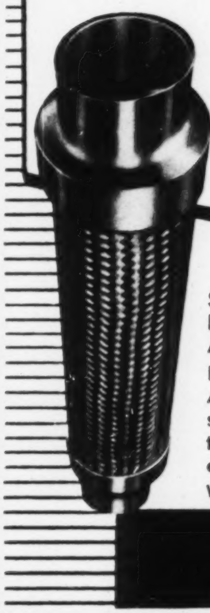

Solve it quickly and easily — install **Packless Seamless Bronze Vibration Absorbers** — standard sizes to fit copper tubing from ¼" O.D. to 10⅛" O.D. Also readily available in longer or shorter lengths made to your specifications — with threaded, flanged or special fittings.

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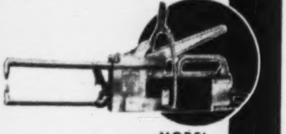
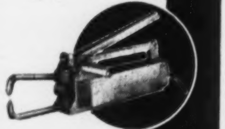
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Here are spot welders that will definitely assist you on your job . . . models to handle the various phases of your work.

Model MSW . . . new concept in spot welder design . . . this handy welder weighs only 23 pounds, and is the original light weight portable spot welder—the leader in its field.

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Model 10 KVA-20 KVA equipped with ball-bearing suspension ring so that you can "spot" weld from any position . . . will handle all sheet metal work . . . manual or pneumatic operation.

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Model LMSW-52 also light in weight . . . it weighs only 31 pounds. It is provided with a "natural" position handle, the same as Model MSW, so that operator can hold welder easily right or left handed.

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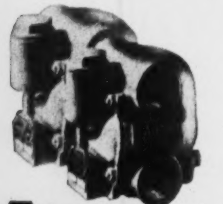
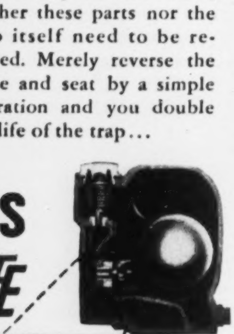



WHEN the valve and valve seat of an ADSCO Dual Steam Trap become worn, neither these parts nor the trap itself need to be replaced. Merely reverse the valve and seat by a simple operation and you double the life of the trap...

ADSCO
DUAL TRAPS
LEAD A DOUBLE LIFE

F & T Type

...And here's another great feature of ADSCO Traps. All working parts are mounted on the cover. Pipe connections do not have to be broken for inspection or service...ADSCO Dual Steam Traps are extremely compact with large capacity. Dual inlet and outlet connections reduce installation costs. In the type shown here, an internal thermostatic element provides an automatic air bypass...For complete information, call an ADSCO representative or write the factory.

AMERICAN DISTRICT STEAM COMPANY, INC.
NORTH TONAWANDA, NEW YORK
Since 1877

ate dimensions. [Manufacturer: Utica Drop Forge & Tool Corp., Utica 4, N. Y.]

Transmission Systems

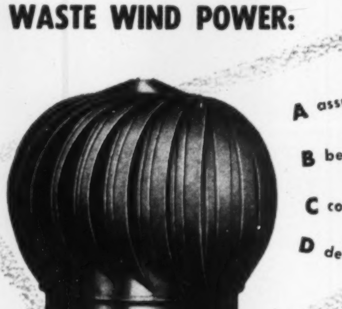
HPAC 127—Catalog T-50 describes the pneumatic, magnetic, electric, electronic and electronic-follower transmission systems for use in measurement and control of flow, pressure, liquid level, viscosity and specific gravity. The catalog is illustrated and contains performance characteristics and schematic diagrams of the various systems. [Manufacturer: Fischer & Porter Co., 7250 Jacksonville Rd., Hatboro, Pa.]

Trencher

HPAC 128—Model 95 trencher is described in this 8-page bulletin. It contains a study of the design, materials and construction and job applications. Information is provided on component parts. A numbered outline photograph positions each important part. Complete dimensions and specifications are given, including tables of optional trench widths and digging wheel and traction speed combinations. [Manufacturer: Cleveland Trencher Company, 20100 St. Clair Ave., Cleveland 17.]

V-Belt Specifications

HPAC 129—Bulletin "'Texrope' Grommet V-Belts," 20B-6497A, gives specifications for the belt made without a splice. According to the manufacturer, it is cooler running, shock absorbent, has one-tenth the shrinkage and one-third the stretch of other belts, offers more grip and is 20 percent stronger. Cross section illustrations show how the grommet v-belt provides high gripping pressure under various load conditions. [Manufacturer: Allis-Chalmers Mfg. Co., 1171 S. 70th St., Milwaukee.]



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A assured performance
B bearings—guaranteed
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The WESTERN ROTARY ventilator continues to exhaust during wind lulls by kinetic energy.

Lifetime guaranteed bearings—bearings that stay in alignment. Both bearings mounted on same axis. Long-lasting metallic-leafing paint finish on durable galvanized steel. Clean, low modern silhouette, completely functional. Throat sizes 6" thru 48" . . .Order today from your wholesaler. Write for prices, specifications, other information. In 1952 Sweet's, A.E.C., Heating, Ventilating & Air Conditioning Guide.

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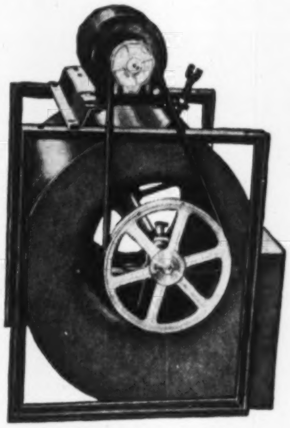

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BLOWER

MASSACHUSETTS . .

By changing the position of the oil cup, the four popular discharges (lower horizontal, upper horizontal, down-blast and up-blast) can be obtained. Sizes 7 to 16½ inches wheel diameter.

WRITE FOR BULLETIN No. 110 CATALOG

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For steam mains and unit heaters

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Since 1887 — Manufacturers of Heating Equipment
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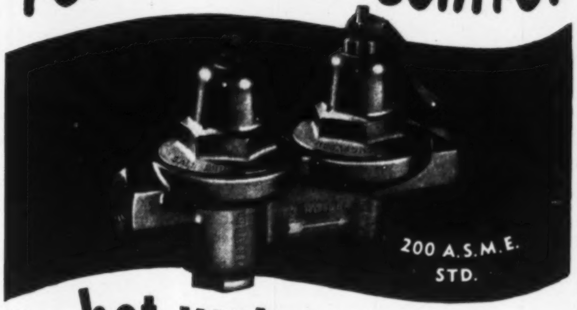

in hot water systems. . .

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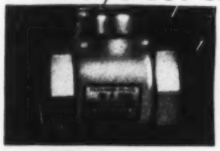
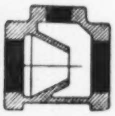
A dependable filler and relief valve for controlling pressures in hot water heating systems. All bronze construction. Factory settings 12 lbs. delivery and 30 lbs. relief.





SALL Fittings greatly improve efficiency of entire hot water system. Only one fitting on return line is needed. This directs free flow of water through radiator.

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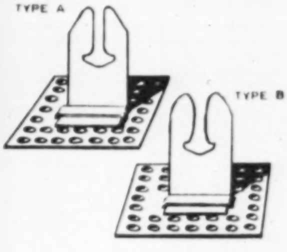
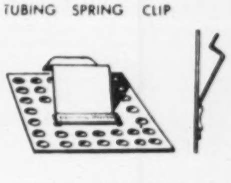
On Air Conditioning and Ventilating Systems





For Securing ¼ and ⅜ inch Control Tubing to Walls and Ducts

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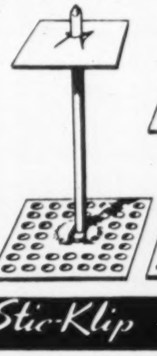
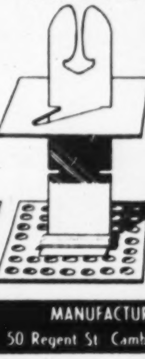


TYPE B WITH LOCKING PLATE



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CALOREX
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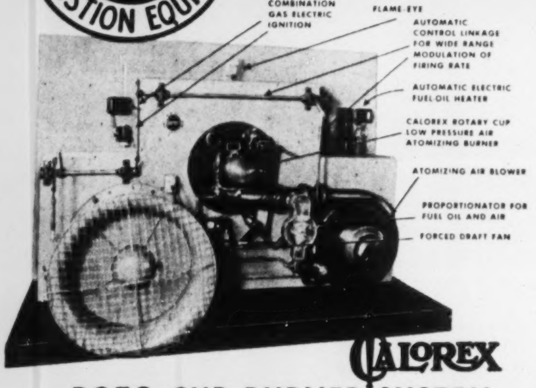
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W. N. BEST presents a packaged system for automatic firing of fuel oil or combination oil and gas for boilers producing 200 H.P. or over.

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415 11th Street CARLSTADT, NEW JERSEY

Vaneaxial Fans

HPAC 130—"Axivane" Series 1000 fans are described in Bulletin J-611. Explained are the advantages of vaneaxial design and the versatility resulting from adjustable blades. Photographs of typical installations are included, as well as information about special duty units and other fans. Specification tables showing volume and pressure capacities and physical dimensions of components are also included. [Manufacturer: Joy Mfg. Co., Henry W. Oliver Bldg., Pittsburgh 22, Pa.]

Venting Valves

HPAC 131—Data sheet describes "Vapor Equalizing Valves" and "Air Eliminators." Photographs and specifications of various models are shown. [Manufacturer: Gorton Heating Corp., Cranford, N. J.]

Vertical Pumps

HPAC 132—"Small Vertical Pumps," 52B6975A, contains construction features of small vertical pumps for sidewall or submerged mounting. Units covered are available in capacities to 250 gpm at heads to 125 ft for coolant circulating, air conditioning, etc. Curves and tables to determine motor frame, horsepower, speed and current characteristics for the various units are included in the bulletin. Also given are construction details of shaft seals and motors. [Manufacturer: Allis-Chalmers Mfg. Co., 1171 S. 70th St., Milwaukee.]

Welding Equipment

HPAC 133—Catalog 150 contains descriptions of equipment necessary for all oxy-acetylene welding and cutting

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COILS
for
HEATING and COOLING

G&O RADIATION

A full line of sizes now available
to meet all industrial requirements.
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Pioneer Manufacturers of Square Finned Tubing in the United States

Here's how to CUT YOUR CUSTOMERS' FUEL BILLS

Always Install a PARAGON 700 Series 7-Day Calendar Time Switch

When you install a 700 Series Time Switch on a heating job, you insure economical operation — and customer satisfaction. For example, it's simple to set the dial to switch to a lower thermostat setting *automatically* Saturday noon, then switch back to the higher setting earlier than usual Monday. At the same time a regular switching schedule for night shutdown of the heating system can be maintained the rest of the week. You can accurately set operations from ON to OFF or from OFF to ON as close as 3 hours apart . . . at *different* hours each day if necessary . . . or you can omit any days desired. You can set it in advance for automatic control of a week's operations — yet make changes instantly when necessary! Send for complete details — now! Ask for bulletin No. HP-5207.

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Dial graduated in hours and half hours — days distinctly marked — day and night periods clearly separated. Available in 24, 115 and 230 volts; 25, 50 and 60 cycles. Prices as low as $36 list.

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TWO RIVERS, WISCONSIN

TWO RIVERS, WISCONSIN

WORLD'S LARGEST EXCLUSIVE MANUFACTURER OF TIME CONTROLS FOR ALL PURPOSES

"our 4 'BEAR' DY-NAMIC BALANCING machines turn out 1000 pieces a day...

each balanced to our tolerance in less than two minutes!" says Thompson Morrison, Vice-President of Morrison Products, Inc., Cleveland, Ohio. Shown are two of the four "Bear" Dy-Namic Balancing Machines which have been in operation here since 1945.

"We found that Dy-Namic Balancing of cooling fans reduces vibration, lessens bearing wear and noise, and results in greater customer acceptance of our products."

"When blower wheels are balanced STATICALLY only, DY-NAMIC unbalance is often increased . . . that's why we use the 'Bear' method, which takes care of both static and dy-namic balance in one operation."

Like hundreds of other industrial plants, Morrison Products Company has discovered that "Bear" Dy-Namic Balancing Machines attain high standards of accuracy at favorable production rates and with minimum capital investment. Reduce noise, vibration, friction, bearing failure thru Dy-Namic Balancing. **FREE MANUAL** shows how! Write: Bear Mfg. Co., Dept. H-16 Rock Island, Ill.

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"BEAR"
STATIC AND *DY-NAMIC BALANCING* MACHINES
balance rotating parts weighing from 4 oz. to 8 tons

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PREVENT THEM!

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SPACE DEODORIZER
NATURE'S PRESCRIPTION FOR FRESHENING AIR

With AIREACTOR in the Air Standing Sentinal Against Odors, Staleness and Stagnation—you continually enjoy the effect of Country Fresh "Air with a Lift."

AIREACTOR uses non-toxic elements found in plant life. . .much the same as masses of green foliage freshen the air out-of-doors. Contains no formaldehyde. Will not burn, or harm sense of smell. Great volatility permits vast penetration when used with a fogging machine.

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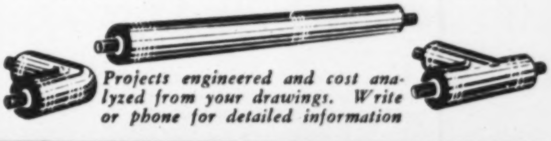

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operations. The text, plus 150 illustrations, provides a complete guide for welders. Each item of equipment is explained in detail with specific recommendations for its use. [Manufacturer: Modern Engineering Co., Dept. 30, 3415 W. Pine Blvd., St. Louis 3.]

Wood Dust Control

HPAC 134—Bulletin 382 discusses dust collection in woodworking plants. It shows the results obtained in various industries using the "Dustube" cloth-tube-type collectors. Another feature included in the booklet is a discussion of how collected wood dust can be channeled to the boilers and used for fuel. [Manufacturer: American Wheelabrator & Equipment Corp., 1321 S. Byrkit St., Mishawaka, Ind.]

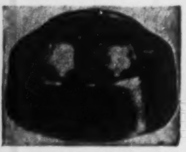
Wrought Iron Pipe

HPAC 135—Five tests for the positive identification of wrought iron pipe are described in the "Wrought Iron Identification" booklet. It tells why recognition of piping material is important and explains how to protect against the use of substitutes. [Manufacturer: A. M. Byers Co., Clark Bldg., Pittsburgh 22.]

Special Purpose Steels

HPAC 136—Twelve-page illustrated catalog describes zinc and aluminum coated steels, other special purpose steels and mechanical steel tubing. One section tells how Type 430 stainless steel may be used as an alternate for Type 302 [Manufacturer: Armco Steel Corp., 703 Curtis St., Middletown, Ohio.]

No. 1
Made solid only
Flat Type



No. 36A
Made split or solid
Clears sleeve 1" high

"RITTER" CAST FLOOR & CEILING PLATES
CAST IRON & CAST BRASS

Ritter Floor & Ceiling Plates are solidly constructed, well designed, and superbly finished. Ritter plates meet City, State & Federal Specifications. We stock all sizes and styles, split or solid; in plain, Nickel or Chrome Plated finish from 1/4" to 12" pipe size. Any special sizes, heights or shapes can be furnished.

Ritter plates have been furnished for: V A Hospitals, Schools, Housing Projects, Terminals, Office Buildings and the United Nations.

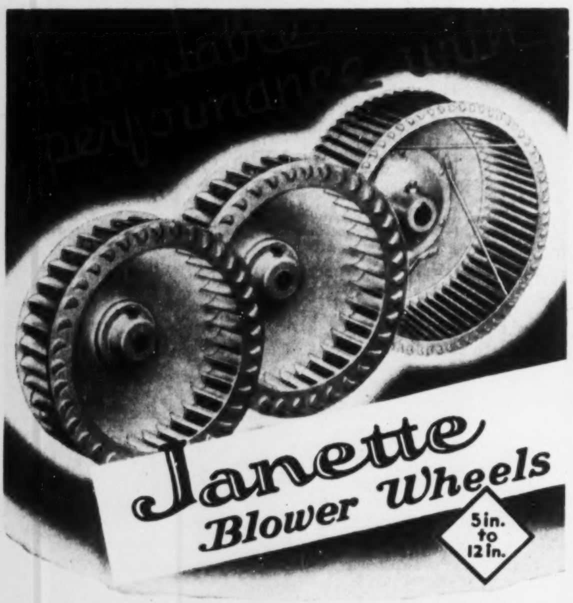
Other "Ritter" Products — Tunnel Stanchions, Pipe Rolls, Flanges and other Piping Specialties.

Write For Circulars

RITTER PATTERN & CASTING CO., INC.
230 CANAL STREET, NEW YORK, N. Y.

No. 3A
Made split or solid
Clears sleeve 1/4" high

No. 7
Made in two halves. Held by two screws. All dimensions to specifications.



DISTINCTIVE FEATURES — The soft steel blades are made in pairs, pressed thru slots in the heavy steel back plate, then welded to the plate. The blade tips are pressed thru slots in the inlet disc then bent back against the spring of the steel blades. This ***patented construction*** results in an exceptionally rigid wheel and ***prevents loose blades***, as no rivets are used in fastening the blades. The heavy cast iron machined hub is riveted to the back plate and will not crack or become loose on the shaft.

JAN-AIR, INC. Manufacturers
RICHMOND - ILLINOIS - U.S.A.

INDUSTRIAL NOISES SILENCED

INCREASE EFFICIENCY • EMPLOYEE MORALE
BETTER PUBLIC RELATIONS

ELIMINATE NOISE FROM

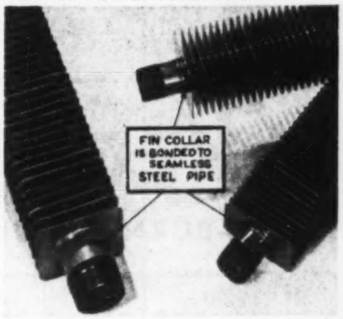
- Power Plants
- Air Conditioning Systems
- Cooling Towers
- Boiler Rooms
- Power Generators
- Transformers
- Fans
- Intake and Exhaust Systems
- Machinery
- Jet Engines
- and Many Others

IAC SILENCERS

Our Engineers Will Gladly Consult With You On Your Noise Problems.

INDUSTRIAL ACOUSTICS COMPANY, Inc.
333 JACKSON AVENUE, NEW YORK 54, N. Y. • CYpress 2-0180

**The TALK of the Heating Industry . . .
the NEW LEE VINE Fin Tube Radiator!**



The fin's extruded collar HARNESSES HEAT, and PUTS IT TO WORK! For greater efficiency, eye appeal, ease of installation, and space-saving, specify LEE VINE Fin Tube Radiators for industrial, commercial and residential use (See photo). Write today for FREE folder. Mfrs. Agents and Distributors wanted.

**LEE VINE Fin Tube
Radiator Co., Inc.
4 Fair St., New Haven,
Conn.**

DIAMOND
TRADE MARK
GRILLES

Look Better — Last Longer

Superior workmanship and finish in heavy-gauge metal assures installations of lasting beauty. Most designs stamped in any thickness, up to one-fourth inch, from any metal. Catalog No. 36 illustrates all designs and gives complete working data. Free on request.

**Diamond Manufacturing Co.
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Sales representatives in all principal cities

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***Classified Section:* Rates for classified advertising are 12 cents for each word, including heading and address. One inch $6.00. Count nine words for keyed address. Minimum $2.00 for each insertion. Cash must accompany order.**

miscellaneous

INDUSTRIAL HANDBOOK

VENTILATION

A practical manual on fume removal, dust collecting, ventilating and exhaust systems for industrial plants. Tells how to design correctly and provide for various ventilation requirements . . . make measurements and analyses of fumes, mists and dusts . . . plan exhaust systems, etc. Twenty eminent authorities contributed also to detailed descriptions of systems in actual operation in many plants, whatever the manufacturing process. 134 pages of practical "know-how" reprinted from HP&AC. Send your order with only $1.50 to get it postpaid from

**KEENEY PUBLISHING CO.
6 N. Michigan Ave.
Chicago 2, Ill.**

**What Happened to That
Pint of Blood YOU
Were Going to Give**

situations open

Sales Engineer with practical experience in application and usage of air handling equipment. Must be able to analyze fan applications and make recommendations to salesmen and customers. Office and factory in Midwest. Address Key 991 A, Heating, Piping & Air Conditioning, 6 No. Michigan Ave., Chicago 2, Ill.

Sales Manager — Manufacturer of products for air conditioning needs qualified man, probably employed at present as assistant. Must be under 40 years of age. New Jersey company is well established, growing, and expects to pay adequate salary. Very little travel. Give complete pertinent information in first letter. State approximate remuneration expected. Address Key 993 A, Heating, Piping & Air Conditioning, 6 No. Michigan Ave, Chicago 2, Ill.

Draftsmen: To work in engineering division of architectural firm. Heating, Ventilating, Boiler piping. Large volume of school work. Write details of training, experience and salary desired to Wolf & Hahn, R. A., 459 Hamilton Street, Allentown, Pennsylvania.

Sales Manager Wanted: By Midwestern residential and commercial steel boiler manufacturer to promote, sell and assist jobbers and coordinate representatives' activities. Distribution national and to name outlets. Furnish personal, educational and experience background and state salary expected. Address Key 995 A, Heating, Piping & Air Conditioning, 6 No. Michigan Ave, Chicago 2, Ill.

situation wanted

Situation Wanted: Application or Sales Engineer, age 27. Graduate M.E., P.E. Seven years experience design, application, sales and service, Heating, Ventilating and Air Conditioning Equipment and systems. Desire position with manufacturer. Midwest—preferably St. Louis or Chicago. Address Key 994A, Heating, Piping & Air Conditioning, 6 No. Michigan Ave., Chicago 2, Ill.

for sale

Large Refrigeration Equipment For Air Conditioning or industrial use.

Used 2 short summers, then cleaned and preserved. Available immediately at great saving. 2 Units manufactured by York, each consisting of 1 centrifugal compressor, 1 water cooler, 1 condenser, 1 synchronous motor 2000 HP, 1 speed increaser, control equipment.

FREELAND PRODUCTS CO.
700 Dryades Street
New Orleans 12, La.

agents wanted

Manufacturers Agent — Three men calling on jobbers and dealers in New England. Desires additional lines in heating and ventilating equipment and supplies.

ACO Sales Company
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Worcester, Mass.
or
Registration Desk — Chicago Show — Jan 20-26.

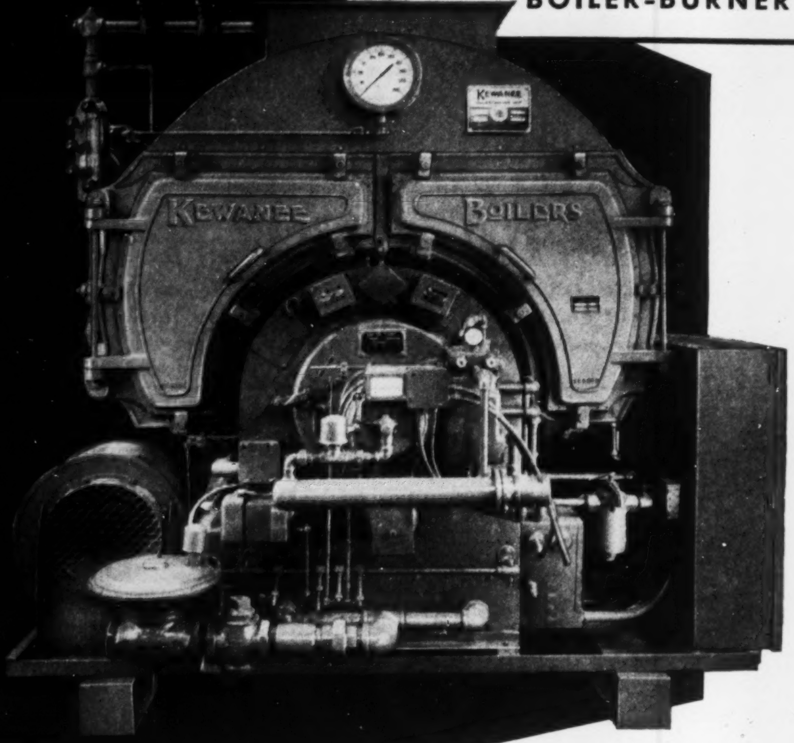
lines wanted

WANTED—Representatives to handle complete line of shell and tube water heaters, radiation converters and heat exchangers. Excellent opportunity for those with a working knowledge of this industry. Killebrew Engineering Corp., 8640 Pardee Lane, St. Louis 23, Missouri.

Announcing the new

KEWANEE-RAY

BOILER-BURNER UNIT



For Oil, Gas or
Combination Gas-Oil

BOOSTS EFFICIENCIES IN ALL FIRING RANGES

Now . . . the Ray Combination Oil-Gas Burner and the Kewanee Scotch type Boiler . . . built to specifications that completely integrate each with the other . . . provide a unit developing high efficiencies throughout the entire firing range.

These higher efficiencies are made possible by the revolutionary new *multi-stage secondary air control,* on the burner, which produces higher flame temperatures in the combustion chamber. And these high efficiencies are maintained even when the unit is operated at 50% and more beyond its rated capacity.

Kewanee-Ray Boiler-Burner Units are built for *both* High and Low Pressure Steam and for Hot Water Heating. 11 sizes—52 to 456 horse power; 125 and 150 lbs wp. . . . 13 sizes for 15 lbs steam or 30 lbs water from 1,313,000 to 10,200,000 Btu.

For complete information see your local Ray or Kewanee Representative

RAY OIL BURNER CO.
1301 San Jose Ave., San Francisco, Calif.

KEWANEE-ROSS CORPORATION
101 Franklin St., Kewanee, Ill.

SECTION OF JANUARY 1953 HEATING, PIPING & AIR CONDITIONING

1953 DIRECTORY

Heating, Piping and Air Conditioning Equipment for Industrial, Commercial, Institutional and Public Buildings

PART 1–Products Classified–Page 2d

If you want to know the names of one or more manufacturers making a certain product, look in Part 1, where products are classified alphabetically in "directory style" with the noun governing (for instance, "unit heaters" are listed under "heaters, unit").

PART 2–Trade Names–Page 100d

If you have the trade name of a product and want to know who manufactures it, look in Part 2, where trade names are alphabetically listed. Trade names the same as or identifiable from the company name are not listed. Manufacturers with such trade names can be easily identified under their product classifications in Part 1.

PART 3–Manufacturers' Addresses–Page 117d

For the complete name and address of any manufacturer look in Part 3.

PART 4–Index to Advertisers and Products Advertised in This Issue–Page 135d

For the page on which you will find the advertising of manufacturers in this issue, as well as information on the products they advertise in this issue, see Part 4.

Heating, Piping & Air Conditioning
6 N. Michigan Ave.
Chicago 2, Illinois

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 1—PRODUCTS CLASSIFIED

ABSORBERS, VIBRATION

See Hose, Metal and Fittings; Bases and Pads, Vibration Isolating

ABSORBERS, VIBRATION, FOR REFRIGERANT LINES

American Metal Hose Branch, The American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
Finn & Co., New York, N. Y.
Firestone Industrial Products, Akron, O.
Flexonics Corp., Maywood, Ill.
Johnson Metal Hose, Inc., Waterbury, Conn.
Packless Metal Products Corp., New Rochelle, N. Y.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Pleasantaire Corp., Washington, D. C.
Resitoflex Corp., Belleville, N. J.
Seamlex Co., Inc., Long Island City, N. Y.
Techniflex Corp., Port Jervis, N. Y.
Titeflex, Inc., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.
Wade Mfg. Co., Elgin, Ill.

ABSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

ABSORPTION REFRIGERATION MACHINES

See Machines, Refrigeration, Absorption

ACCESS DOORS AND PANELS

See Doors and Panels, Access

ACCUMULATORS, REFRIGERATION (FOR AIR CONDITIONING)

Acme Industries, Inc., Jackson, Mich.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Dole Refrigerating Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
McQuay, Inc., Minneapolis, Minn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Phillips & Co., H. A., Chicago, Ill.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y.
Roessing Mfg. Co., Pittsburgh, Pa.
Techniflex Corp., Port Jervis, N. Y.
Temprite Products Corp., Birmingham, Mich.
Vilter Mfg. Co., The, Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
XL Refrigerating Co., Chicago, Ill.

ADHESIVES, FOR PIPE COVERING

Arabol Mfg. Co., New York, N. Y.
Armstrong Cork Co., Lancaster, Pa.
Flintkote Co., The, New York, N. Y.
Foster Co., Benjamin, Philadelphia, Pa.
Fuller Co. of Calif., H. B., San Francisco, Calif.
Grant Wilson, Inc., Chicago, Ill.
Keasbey & Mattison Co., Ambler, Pa.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Miracle Adhesives Corp., New York, N. Y.
Moore Inc., Goodloe E., Danville, Ill.
Mystik Adhesive Products, Div. of Chicago Show Printing Co., Chicago, Ill.
National Cork Co., Englewood, N. J.
Pecora Paint Co., Inc., Philadelphia, Pa.
Presstite Engineering Co., St. Louis, Mo.
Sauereisen Cements Co., Pittsburgh, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.
Stic-Klip Mfg. Co., Cambridge, Mass.
Swift & Co., Chicago, Ill.

ADSORBERS, ODOR

Aerotrol Engineering Co., Pittsburgh, Pa.
Carbide and Carbon Chemicals Div., Union Carbide & Carbon Corp., New York, N. Y.
Connor Engineering Corp., W. B., Danbury, Conn.
Pur Air Div., American Solvent Recovery Corp., Columbus, O.
Refinite Corp., Omaha, Neb.
Research Products Corp., Madison, Wis.
Reynolds Electric Co., River Grove, Ill.
Tamms Industries, Inc., Chicago, Ill.

ADSORPTION DEHUMIDIFIERS

See Dehumidifiers, Absorption and Adsorption

AFTERCOOLERS, COMPRESSED AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
Air Conversion Research Corp., Chicago, Ill.
American Locomotive Co., Alco Products Div., New York, N. Y.
American Moistening Co., Providence, R. I.
Andale Co., Philadelphia, Pa.
Armstrong Co., Richard M., Westchester, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Brown Fintube Co., The, Elyria, O.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Condenser Service & Engineering Co. Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Downington Iron Works, Downington, Pa.
Doyle and Roth Mfg. Co., Inc., Brooklyn, N. Y.
Electric Sprayit Co., The, Sheboygan, Wis.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, New York, N. Y.
Halstead & Mitchell, Pittsburgh, Pa.
Heat-X-Changer Co., Inc., Brewster, N. Y.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Johnson Corp., The, Three Rivers, Mich.
Joy Mfg. Co., Pittsburgh, Pa.
Kewanee-Ross Corp., Kewanee, Ill.
Manning & Lewis Engineering Co., Newark, N. J.
Modine Mfg. Co., Racine, Wis.
Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Ruemelin Mfg. Co., Milwaukee, Wis.
Schramm, Inc., West Chester, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Wilson Engineering Corp., Chicago, Ill.
Worthington Pump & Machinery Corp., Harrison, N. J.
Young Radiator Co., Racine, Wis
Yula Water Heaters, Inc., New York, N. Y.

AIR AFTERCOOLERS

See Aftercoolers, Compressed Air

AIR BREAK FITTINGS

See Fittings, Draining, Fixed Air Break

AIR CLEANERS

See Cleaners, Air, Electrical

AIR COMPRESSORS

See Compressors, Air

AIR CONDITIONERS

See Units, Air Conditioning

AIR CONDITIONING UNITS

See Units, Air Conditioning

AIR DIFFUSERS

See Diffusers, Air Ceiling; Grilles; Panels, Perforated, for Air Diffusion; Registers

AIR ELIMINATORS

See Eliminators, Air

AIR FILTER CLEANING COMPOUNDS

See Compounds, Cleaning, Air Filter

AIR FILTER GAGES

See Gages, Air Filter

AIR FILTERS

See Filters, Air

AIR FRESHENING

See Compounds, Air Freshening; Adsorbers, Odor

AIR OPERATING VALVES

See Valves, Air Operating

AIR PURIFICATION

See Adsorbers, Odor; Compounds, Air Freshening

AIR RECOVERY EQUIPMENT

See Adsorbers, Odor

AIR SEPARATORS

See Separators, Air

AIR-TANKLESS WATER HEATERS

See Heaters, Water, Air-Tankless

AIR VALVES

See Valves, Radiators, Air

AIR VELOCITY METERS

See Meters, Air Velocity, Direct Reading; Anemometers

AIR VENTS

See Eliminators, Air

AIR VOLUME METERS

See Meters, Volume, Air and Gas

AIR WASHERS

See Washers, Air

ALARMS, COMBUSTIBLE GAS

Bailey Meter Co., Cleveland, O.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., Newark, N. J.
Johnson-Williams Ltd., Palo Alto, Calif.
Mine Safety Appliances Co., Pittsburgh, Pa.
Taller & Cooper, Inc., Brooklyn, N. Y.

ALARMS, HIGH AND LOW BOILER WATER

American District Telegraph Co., New York, N. Y.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Campbell Co., J. A., Long Beach, Calif.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Coral Designs, Long Island City, N. Y.
Defender Instrument & Regulator Co., St. Louis, Mo.
Diamond Power Specialty Corp., Lancaster, O.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer & Porter Co., Hatboro, Pa.
Johnson Corp., The, Three Rivers, Mich.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Milton Roy Co., Philadelphia, Pa.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Controls Co., Bloomfield, N. J.
Penn Controls, Inc., Goshen, Ind.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reliance Gauge Column Co., Cleveland, O.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Schaub Engineering Co., Fred H., Chicago, Ill.
Unit Alarm Co., The, Schenectady, N. Y.
Wright-Austin Co., Detroit, Mich.
Yarnall-Waring Co., Philadelphia, Pa.

ALARMS, LIQUID LEVEL, AUDIBLE

American District Telegraph Co., New York, N. Y.
Automatic Control Co., St. Paul, Minn.
B/W Controller Corp., Birmingham, Mich.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., The, Waterbury, Conn.
Clark Controller Co., Cleveland, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Liquidepth Indicators, Inc., Long Island City, N. Y.
Maid-O'-Mist, Inc., Chicago, Ill.
Milton Roy Co., Philadelphia, Pa.
Newark Controls Co., Bloomfield, N. J.
Reliance Gauge Column Co., Cleveland, O.
Ripley Co., Inc., Middletown, Conn.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Scully Signal Co., Cambridge, Mass.
Uehling Instrument Co., Paterson, N. J.
Unit Alarm Co., The, Schenectady, N. Y.
Wright-Austin Co., Detroit, Mich.

ALARMS, SMOKE

American District Telegraph Co., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cleveland Fuel Equipment Co., Cleveland, Ohio
Combustion Control Corp., Cambridge, Mass.
Defender Instrument & Regulator Co., St. Louis, Mo.
De-Tec-Tronic Laboratories, Inc., Chicago, Ill.
Edwards, L. V., Rockville Center, N. Y.
Ess Instrument Co., Bergenfield, N. J.
Ess Specialty Corp., Bergenfield, N. J.
General Power Plant Corp., Ossining, N. Y.
McNeill Engineering Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Ripley Co., Inc., Middletown, Conn.
Sterns-Flinn Corp., New York, N. Y.
Unit Alarm Co., The, Schenectady, N. Y.
Worner Electronic Devices, Rankin, Ill.

ALGAE AND SLIME CONTROL, WATER TREATMENT FOR

See Treatment, Water, for Slime and Algae Control

ALUMINUM COATED SHEETS

See Sheets, Aluminum Coated

ALUMINUM PIPE

See Pipe, Aluminum

ALUMINUM SHEETS

See Sheets, Aluminum

ANALYZERS, CARBON DIOXIDE, PORTABLE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Engelhard, Inc., Chas., Newark, N. J.
General Power Plant Corp., Ossining, N. Y.
Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Service to Industry, West Hartford, Conn.
Uehling Instrument Co., Paterson, N. J.
Victory Engineering Corp., Union, N. J.
Will Corp., Rochester, N. Y.

ANCHORS FOR INSULATION

See Fasteners, Insulation

ANEMOMETERS

Barclay, Inc., Robert, Chicago, Ill.
Beckman & Whitley, Inc., San Carlos, Calif.
Dietzgen Co., Eugene, Chicago, Ill.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Hill, E. Vernon & Co., Chicago, Ill.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.

ANGLE VALVES

See Valves, Angle

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Aluminum Co. of America, Pittsburgh, Pa.
American Brass Co., Waterbury, Conn.
Atlantic Steel Co., Atlanta, Ga.
Bethlehem Steel Co., Bethlehem, Pa.
Byers Co., A. M., Pittsburgh, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Columbia Steel Co., United States Steel Corp., Subsidiary, San Francisco, Calif.
Decatur Iron & Steel Co., Decatur, Ala.
Dow Chemical Co., The, Midland, Mich.
Inland Steel Co., Chicago, Ill.
Inland Steel Products Co., Milwaukee, Wis.
International Steel Co., Evansville, Ind.

Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Kling Bros. Engineering Wks., Chicago, Ill.
Laclede Steel Co., St. Louis, Mo.
Lees, John, Div., The Serrick Corp., Muncie, Ind.
Meaker Steel Corp., Geo. L., Evansville, Ind.
Republic Steel Corp., Cleveland, O.
Revere Copper and Brass, Incorporated, New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Tennessee Coal & Iron Div., United States Steel Corp., Fairfield, Ala.
Truscon Steel Co., Youngstown, O.
United States Steel Co., Pittsburgh, Pa.
Weirton Steel Co., Weirton, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

ANODES FOR CORROSION PROTECTION

See Devices, Electrolytic, for Preventing Corrosion

ANTI-FREEZE COMPOUNDS FOR SNOW MELTING

See Compounds, Anti-Freeze

AQUASTATS

See Thermostats

ARC WELDERS

See Welders, Arc

ARC WELDING ELECTRODES

See Electrodes, Arc Welding

ASBESTOS FIBER AND CEMENT PIPE

See Pipe, Asbestos Fiber and Cement

ASBESTOS PACKING

See Packing, Asbestos

ASH CONVEYORS

See Conveyors, Coal and Ash

ASSEMBLIES, MANIFOLD, FOR METERS

Foxboro Co., Foxboro, Mass.

ATOMIZING NOZZLES

See Nozzles, Atomizing

AXIAL FLOW FANS

See Fans, Axial Flow, Pressure Type

BACKING RINGS

See Rings, Welding

BALANCING ELBOWS FOR HOT WATER HEATING SYSTEMS

See Elbows, Balancing, for Hot Water Heating Systems

BALANCING EQUIPMENT

See Equipment, Balancing

BALANCING VALVES

See Valves, Balancing

BALL BEARINGS

See Bearings, Ball

BAROMETRIC CONTROLS

See Controls, Draft, Barometric

BASEBOARD RADIATION

See Radiation, Baseboard

BASES, MOTOR, TENSION ADJUSTING

Ackermann Mfg. Co., Wheeling, W. Va.
Alexander Bros., Philadelphia, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Electrovent Fan & Mfg. Co., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Rhoads & Sons, J. E., Philadelphia, Pa.
Valley Foundry & Machine Works, Inc., Fresno, Calif.

BASES AND PADS, VIBRATION ISOLATING

Barry Corp., Watertown, Mass.
Buffalo Forge Co., Buffalo, N. Y.
Celotex Corp., The, Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Clarage Fan Co., Kalamazoo, Mich.
Cork Insulation Co., Inc., New York, N. Y.
Fabreeka Products Co., Inc., Boston, Mass.
Felters Company, The, Boston, Mass.
Finn & Co., New York, N. Y.
Firestone Industrial Products, Akron, O.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hobsite Products Co., Harrison, N. J.
Johns-Manville, New York, N. Y.
Korfund Co., Inc., Long Island City, N. Y.
Lord Mfg. Co., Erie, Pa.
M B Mfg. Co., Inc., The, New Haven, Conn.
Mundet Cork Corp., North Bergen, N. J.
National Cork Co., Englewood, N. J.
National Lead Co., New York, N. Y.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Raybestos-Manhattan, Inc., Passaic, N. J.
Robinson Aviation, Inc., Teterboro, N. J.
Sponge Rubber Products Co., The, Shelton, Conn.
United Cork Companies, Kearny, N. J.
United States Rubber Co., New York, N. Y.
Vibration Eliminator Co., Long Island City, N. Y.
Western Felt Works, Chicago, Ill.

BEARINGS, BALL

Ahlberg Bearing Co., Chicago, Ill.
Bearings Co. of America, Lancaster, Pa.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., The, New Britain, Conn.
Landis & Gyr Inc., New York, N. Y.
Link Belt Co., Indianapolis, Ind.
Marlin-Rockwell Corp., Jamestown, N. Y.
New Departure Div., General Motors Corp., Bristol, Conn.
Nice Ball Bearing Co., Philadelphia, Pa.
Norma-Hoffman Bearings Corp., Stamford, Conn.
SKF Industries, Inc., Philadelphia, Pa.
Schatz Mfg. Co., The, Poughkeepsie, N. Y.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Thomson Industries, Inc., Manhasset, N. Y.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, NEEDLE

Roller Bearing Co. of America, Trenton, N. J.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.

BEARINGS, PILLOW BLOCK

Ahlberg Bearing Co., Chicago, Ill.
Anti-Friction Bearings Co., Los Angeles, Calif.
Caldwell Co., W. E., Louisville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Clizbe Bros., Mfg. Co., Plymouth, Ind.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Fafnir Bearing Co., The, New Britain, Conn.
Freed Products Co., Moline, Ill.
Goldens' Foundry & Machine Co., Columbus, Ga.
Jeffrey Mfg. Co., Columbus, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Lau Blower Co., Dayton, O.
Link Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Moraine Products Div., General Motors Corp., Dayton, O.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Randall Graphite Bearings, Inc., Lima, O.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing Corp., Downers Grove, Ill.
Sprout, Waldron & Co., Muncy, Pa.
Standard Pressed Steel Co., Jenkintown, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Triangle Mfg. Co., Oshkosh, Wis.
Whiteley Bearing Corp., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, ROLLER

Dodge Mfg. Corp., Mishawaka, Ind.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Norma-Hoffman Bearings Corp., Stamford, Conn.
Roller Bearing Co. of America, Trenton, N. J.
Royersford Foundry & Machine Co, Inc., Royersford, Pa.
SKF Industries, Inc., Philadelphia, Pa.
Shafer Bearing Corp., Downers Grove, Ill. (self aligning)
Timken Roller Bearing Co., Canton, O.
Torrington Co., The, Bantam Bearings Div., South Bend, Ind.
Wood's Sons Co., T. B., Chambersburg, Pa.

BEARINGS, SLEEVE

Bronze Bearings, Inc., Cranford, N. J.
Chemalloy Associates, Santee, Calif.
Cleveland Graphite Bronze Co., Cleveland, O.
Dodge Mfg. Corp., Mishawaka, Ind.
Federal-Mogul Corp., Detroit, Mich.
Green Fuel Economizer Co., Beacon, N. Y.
International Powder Metallurgy, Inc., Ridgway, Pa.
Johnson Bronze Co., New Castle, Pa.

Keystone Carbon Co., Inc., St. Marys, Pa.
Medart Co., St. Louis, Mo.
Moraine Products Div., General Motors Corp., Dayton, O.
Morganite, Inc., Carbon Specialties Div., Long Island City, N. Y.
Randall Graphite Bearings, Inc., Lima, O.
Thomson Industries, Inc., Manhasset, N. Y.
Whiteley Bearing Corp., Chicago, Ill.
Wood's Sons Co., T. B., Chambersburg, Pa.

BELLOWS, THERMOSTATIC AND METALLIC

Bishop & Babcock Mfg. Co., Cleveland, O.
Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., Bridgeport, Conn.
Clifford Mfg. Co., of Standard-Thomson Corp., Waltham, Mass.
Cook Electric Co., Chicago, Ill.
Flexonics Corp., Maywood, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
MagniLastic Div., Cook Electric Co., Chicago, Ill.
Zallea Bros., Wilmington, Del.

BELTING, FLAT, LEATHER

Alexander Bros., Philadelphia, Pa.
Allen Mfg. Co., W. D., Chicago, Ill.
Baldwin Belting, Inc., New York, N. Y.
Chicago Belting Co., Chicago, Ill.
Graton & Knight Co., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
Sikes Co., S. R., Minneapolis, Minn.
Williams & Son, I. B., Dover, N. H.

BELTING, FLAT, RUBBER

Boston Woven Hose & Rubber Co., Cambridge, Mass.
Dick Co., Inc., R. & J., Passaic, N. J.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Manheim Mfg. & Belting Co., Manheim, Pa.
New York Belting & Packing Co., Passaic, N. J.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.

BELTS, V

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
America Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
Dayton Rubber Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Durkee-Atwood Co., Minneapolis, Minn.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Gates Rubber Co., Denver, Colo.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Manheim Mfg. & Belting Co., Manheim, Pa.
Maurey Mfg. Corp., Chicago, Ill.
Medart Co., St. Louis, Mo.
New York Belting & Packing Co., Passaic, N. J.
Pyott Foundry & Machine Co., Chicago, Ill.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Corp., Harrison, N. J.

BENDERS, PIPE

American Pipe Bending Machine Co., Inc., Poultney, Vt.
American Pipe Tool Co., Chicago, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Capewell Mfg. Co., Hartford, Conn.
Crown Die & Tool Co., Chicago, Ill. (Hand)
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Pacific Machine & Iron Wks., Tacoma, Wash.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Radiant Devices, St. Louis, Mo.
Sac Tool Mfg. Co., St. Louis, Mo.
Solon Mfg. Co., Solon, O.
Tal Bender, Inc., Milwaukee, Wis.
Vanderman Mfg. Co., Willimantic, Conn.
Wallace Supplies Mfg. Co., Chicago, Ill.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

BENDERS, TUBING

Blackhawk Mfg. Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill.
Griffith Equipment Co., Inc., Los Angeles, Calif.
Holsclaw Bros., Inc., Evansville, Ind.
Hossfeld Mfg. Co., Winona, Minn.
Imperial Brass Mfg. Co., Chicago, Ill.
Keeney Mfg. Co., Newington, Conn.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Pacific Machine & Iron Wks., Tacoma, Wash.
Parker Appliance Co., The, Cleveland, O.
Pedrick Tool & Machine Co., Philadelphia, Pa.
Pines Engineering Co., Inc., Aurora, Ill.
Republic Steel Corp., Steel and Tubes Div., Cleveland, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Solon Mfg. Co., Solon, O.
Steel City Electric Co., Pittsburgh, Pa.
Tal Bender, Inc., Milwaukee, Wis.
Wallace Supplies Mfg. Co., Chicago, Ill.

BENDS, EXPANSION, STEAM PIPE

Albert Pipe Supply Co., Brooklyn, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Atlantic Pipe Bending & Fabricating Corp., Edgewater, N. J.
Blaw-Knox Construction Co., Power Piping and Sprinkler Div., Pittsburgh, Pa.
Clow & Sons, James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Grinnell Co., Inc., Providence, R. I.
Harris & Co., Arthur, Chicago, Ill. (Stainless & non-ferrous)
Kellogg Co., M. W., The, New York, N. Y. (Corrugated steel)
Lunsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
National Valve & Mfg. Co., Pittsburgh, Pa.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Rempe Co., Chicago, Ill.
Ric-wiL Co., Cleveland, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw-Kendall Engineering Co., Toledo, O.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Walworth Co., New York, N. Y.
Western Piping & Engineering Co., San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.

BI-METALS, THERMOSTATIC

Baker & Co., Inc., Newark, N. J.
Chace Co., W. M., Detroit, Mich.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wilson Co., H. A., The, Newark, N. J.

BLADES, PROPELLER FAN

Ackermann Mfg. Co., Wheeling, W. Va.
Aeromatic Propeller Dept., Baltimore, Md.
Aerovent Fan Co., Inc., Piqua, O.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill.
Alliance Mfg. Co., Alliance, O.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Bronson Fan Mfg. Co., Los Angeles, Calif.
Burden Co., Alan E., Los Angeles, Calif.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dual-Air Fan Co., South Elgin, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
International Engrg. Inc., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Motionair Co., Los Angeles, Calif.

Myers Electric Co., Inc., Pittsburgh, Pa.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Peerless Electric Co., Warren, O.
Propellair Div., Robbins & Meyers Inc., Springfield, O.
Roto-Beam, Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sensenich Corp., Lancaster, Pa.
South Bend Air Products, Inc., South Bend, Ind.
Standard Electric Mfg. Co., West Berlin, N. J.
Thermal Industries, Indio, Calif.
Torrington Mfg. Co., Torrington, Conn.
Torrington Mfg. Co., The, Western Div., Van Nuys, Calif.
Wind-Way Fan & Ventilator Co., New Orleans, La.

BLAST GATES

See Gates, Blast

BLAST HEATERS

See Surface, Finned, Heating

BLAST HEATING COILS

See Surface, Finned, Heating

BLINDS, LINE, PIPE

Hamer Oil Tool Co., Long Beach, Calif.

BLOCKS, TERMINAL, FOR ELECTRICAL CONNECTIONS

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Marathon Electric Mfg. Corp., Wausau, Wis.

BLOW PIPE FITTINGS

See Fittings, Blow Pipe

BLOWER FANS

See Fans, Axial Flow and Fans, Centrifugal

BLOWER HOUSINGS

See Housings, Fan

BLOWER WHEELS

See Wheels, Blower

BLOWERS, HIGH PRESSURE

For Low Pressure Blower Fans, See Fans, Centrifugal

Aladdin Heating Corp., Oakland, Calif.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Blower Corp., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Beach-Russ Co., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carling Turbine Blower Co., Worcester, Mass.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Corp., Franklin Park, Ill.
Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis, Minn.
De Laval Steam Turbine Co., Trenton, N. J.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
General Blower Co., Morton Grove, Ill.
Ilg Electric Ventilating Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Joy Mfg., Pittsburgh, Pa.
Lammert & Mann Co., Chicago, Ill.
Lamson Corp., Blower Div., Syracuse, N. Y.
Martin Fan & Blower Co., Chicago, Ill.
North American Mfg. Co., Cleveland, O.
Power Engineering Co., Chicago, Ill.
Prat-Daniel Corp., South Norwalk, Conn.
Read Standard Corp., Blower-Stoker Div., York, Pa.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Roots-Connersville Blower Corp., Connersville, Ind.
Spencer Turbine Co., Hartford, Conn.
Standard Electric Mfg. Co., West Berlin, N. J.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Linden, N. J.

BLOWERS, SOOT

Bayer Co., St. Louis, Mo.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Diamond Power Specialty Corp., Lancaster, O.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Marion Machine Foundry & Supply Co., Marion, Ind.
Perfection Grate & Stoker Co., Springfield, Mass.

BLOW-OFF VALVES

See Valves, Blow-off

BLUE PRINT MACHINES

See Machines, Blue Print and White Print

BOARDS, PANEL AND CONTROL

Aqua Electric Scale Control, Inc., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Littleford Bros., Inc., Cincinnati, O.
Marsh Heating Equipment Co., Skokie, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Square D Co., Detroit, Mich.
Taller & Cooper, Inc., Brooklyn, N. Y.
Trerice Co., H. O., Detroit, Mich.
Westinghouse Electric Corp., Pittsburgh, Pa.

BOILER CLEANING COMPOUNDS

See Compounds, Boiler Cleaning

BOILER FEED PUMPS

See Pumps, Boiler Feed

BOILER FEEDERS

See Feeders, Water, Heating Boiler

BOILER GAGES

See Gages, Liquid Level

BOILER OBSERVATION PORTS

See Ports, Observation, Boiler

BOILER SEALING COMPOUNDS

See Compounds, Boiler and Radiator Sealing

BOILER AND TANK INSULATION

See Insulation, Boiler and Tank

BOILER TUBES

See Tubes, Boiler

BOILER WATER ALARMS

See Alarms, High and Low Boiler Water

BOILERS, ELECTRIC

See Generators, Steam, Electric

BOILERS, HEATING, CAST IRON, SECTIONAL

2000 *Sq Ft Steam Radiation and Over*

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Burnham Corp., Boiler Div., Irvington, N. Y.
Crane Co., Chicago, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Radiator Co., The, Johnstown, Pa.
Norge Heat Div., Borg-Warner Corp., Kalamazoo, Mich.
Peerless Heater Div., The Eastern Foundry Co., Boyertown, Pa. (gas fired)
Pennsylvania Furnace & Iron Co., Warren, Pa.
Prox Co., Inc., Frank, Terre Haute, Ind.
Richmond Radiator Co., New York, N. Y.
Smith Co., Inc., H. B., The, Westfield, Mass.
Surface Combustion Corp., Toledo, O.
United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Michigan City, Ind.

BOILERS, HEATING, STEEL, FIRE TUBE

2000 *Sq Ft Steam Radiation and Over*

Aldrich Co., Wyoming, Ill.
Alert Boiler & Mfg. Co., Detroit, Mich.
American Shipbuilding Co., Cleveland, O.
Ames Iron Works, Inc., Oswego, N. Y.
Atlantic Steel Boiler Co., Philadelphia, Pa.
Bigelow Co., New Haven, Conn.
Birchfield Boiler, Inc., Tacoma, Wash.
Boiler Engineering & Supply Co., Inc., Phoenixville, Pa.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Burnham Corp., Boiler Div., Irvington, N. Y.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Dewey-Shepard Boiler Co., Indianapolis, Ind.
Crotty Mfg. Corp., Flushing, L. I., N. Y.
Dillon Steam Boiler Wks., Inc., D. M., Fitchburg, Mass.

Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Edge Moor Iron Works, Inc., Edge Moor, Del.
Erie City Iron Wks., Erie, Pa.
Farrar & Trefts, Buffalo, N. Y.
Fitzgibbons Boiler Co., Inc., New York, N. Y.
Frost Mfg. Co., Galesburg, Ill.
Hamburg Boiler Works, Inc., Hamburg, Pa.
Hodge Boiler Wks., East Boston, Mass.
International Engineering Wks., Inc., Framingham, Mass.
Johnston Bros., Inc., Ferrysburg, Mich.
Kewanee-Ross Corp., Kewanee, Ill.
Leffel & Co., James, Springfield, O.
Lookout Boiler & Mfg. Co., Chattanooga, Tenn.
Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
Mund Boilers, Inc., Los Angeles, Calif.
Murray Iron Wks. Co., Burlington, Ia.
National Radiator Co., The, Johnstown, Pa.
Norse Boiler Co., Inc., New Market, N. J.
Orr & Semblower, Inc., Reading, Pa.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich
Portmar Boiler Co., Inc., Brooklyn, N. Y.
Republic Boiler Corp., New York, N. Y.
Rite Engineering & Mfg. Corp., Los Angeles, Calif.
Smith Twin Tubular Boiler Co., Inc., Philadelphia, Pa.
Spencer Heater, Lycoming-Spencer Division, Avco Mfg. Corp., Williamsport, Pa.
Stout & Sons, David, St. Louis, Mo.
Terre Haute Boiler Works Co., Terre Haute, Ind.
Titusville Iron Wks. Co., The, Titusville, Pa.
Union Iron Wks., Erie, Pa.
Wickes Boiler Co., Saginaw, Mich.

BOILERS, HEATING, STEEL, WATER TUBE

Anetsberger Bros., Inc., Northbrook, Ill.
Babcock & Wilcox Co., New York, N. Y.
Bigelow Co., The, New Haven, Conn.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Bryan Steam Corp., Peru, Ind.
Central States Steel Boiler Co., Chicago, Ill.
Columbia Boiler Co., Pottstown, Pa.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crotty Mfg. Corp., Flushing, L. I., N. Y.
Edge Moor Iron Wks., Inc., Edge Moor, Del.
Erie City Iron Wks., Erie, Pa.
International Boiler Wks. Co., The, East Stroudsburg, Pa.
International Engineering Wks., Inc., Framingham, Mass.
Keeler Co., E., Williamsport, Pa.
Koven & Bro., L. O., Inc., Jersey City, N. J.
Morheat Corp., Lansing, Mich.
Mund Boilers, Inc., Los Angeles, Calif.
Murray Iron Wks., Co., Burlington, Ia.
Parker Boiler Mfg. Co., Sid E., Los Angeles, Calif.
Riley Stoker Corp., Worcester, Mass.
Springfield Boiler Co., Springfield, Ill. (750 to 25,000 lb per hr, 160 psi and above, gas and oil fired)
Super Mold Corp., Lodi, Calif.
Titusville Iron Works Co., The, Titusville, Pa.
V. & E. Products, Inc., Schuylkill Haven, Pa.
Viking Mfg. Corp., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
Waterfilm Boilers, Inc., Jersey City, N. J.
Wickes Boiler Co., Saginaw, Mich.
Will-Burt Co., The, Orrville, O.

BOILERS, PACKAGED STEAM GENERATING UNITS, HEATING AND PROCESS—*including Controls, Feed Pump, etc.*

Ames Iron Works, Inc., Oswego, N. Y.
Babcock & Wilcox Co., New York, N. Y.
Boiler Engineering & Supply Co., Phoenixville, Pa.
Clayton Mfg. Co., El Monte, Calif.
Cleaver-Brooks Co., Milwaukee, Wis.
Columbia Boiler Co., Pottstown, Pa.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Consolidated Boiler Corp., Boston, Mass.
Cyclotherm Div., United States Radiator Corp., Oswego, N. Y.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Edge Moor Iron Works, Inc., Edge Moor, Del.
Erie City Iron Works, Erie, Pa.
Foster Wheeler Corp., New York, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Johnston Bros., Inc., Ferrysburg, Mich.
Keeler Co., E., Williamsport, Pa.
Kewanee-Ross Corp., Kewanee, Ill.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lattner Mfg. Co., P. M., Cedar Rapids, Iowa
Littleford Bros., Inc., Cincinnati, O.
Martin Co., Inc., J. O., San Francisco, Calif.
Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Mund Boilers, Inc., Los Angeles, Calif.
Orr & Sembower, Inc., Reading, Pa.
Parker Boiler Mfg. Co., Sid E., Los Angeles, Calif.
Preferred Utilities Mfg. Corp., New York, N. Y.
Sellers Engineering Co., Chicago, Ill.
Springfield Boiler Co., Springfield, Ill.
Superior Combustion Industries, Inc., New York, N. Y.
Texsteam Corp., Houston, Tex.
Titusville Iron Works Co., The, Titusville, Pa.
Union Iron Works, Erie, Pa.
Vapor Heating Corp., Chicago, Ill.
Wickes Boiler Co., Saginaw, Mich.
York-Shipley, Inc., York, Pa.

BOLTS, EXPANSION

Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Industrial Screw Co., Chicago, Ill.
Kenney Co., L. C., Chicago, Ill.
Master Craft Products, Jamaica, N. Y.
National Lead Co., New York, N. Y.
Paine Co., Addison, Ill.
Polis Mfg. Co., J. D., Chicago, Ill.
Rawlplug Co., Inc., The, New York, N. Y.
Star Expansion Bolt Co., New York, N. Y.
U. S. Expansion Bolt Co., York, Pa.

BOLTS AND STUDS, FLANGE

Bethlehem Steel Co., Bethlehem, Pa.
Buffalo Bolt Co., Div. of Buffalo-Eclipse Corp., North Tonawanda, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Clark Bros. Bolt Co., Milldale, Conn.
Continental Screw Co., New Bedford, Mass.
Crane Co., Chicago, Ill.
Erie Bolt & Nut Co., Erie, Pa.
Harper Co., H. M., Morton Grove, Ill.
Haskell Mfg. Co., Wm. H., Pawtucket, R. I.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Polis Mfg. Co., J. D., Chicago, Ill.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Rockford Screw Products Co., Rockford, Ill.
Russell, Purdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Victor Products Corp., Chicago, Ill.

BOLTS, TOGGLE AND ANCHOR

Carpenter & Paterson, Inc., East Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Expansion Bolt Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Diamond Expansion Bolt Co., Inc., Garwood, N. J.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Industrial Screw Co., Chicago, Ill.
Moore, Inc., Goodloe E., Danville, Ill.
Paine Co., Addison, Ill.
Polis Mfg. Co., J. D., Chicago, Ill.
Rawlplug Co., Inc., The, New York, N. Y.
Republic Steel Corp., Cleveland, O.
Star Expansion Bolt Co., New York, N. Y.
U. S. Expansion Bolt Co., York, Pa.

BOOSTERS, GAS

Eclipse Fuel Engineering Co., Rockford, Ill.
North American Mfg. Co., Cleveland, O.
Roots-Connersville Blower Div., Connersville, Ind.

BOOTHS, PAINTING, SPRAY

Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Parkton, Md.
Centri-Spray Corp., Detroit, Mich. (wet type)
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
DeVilbiss Co., The, Toledo, O.
Electric Sprayit Co., The, Sheboygan, Wis.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Kirk & Blum Mfg. Co., Cincinnati, O.
Mahon Co., R. C., The, Detroit, Mich.
M & E Mfg. Co., Indianapolis, Ind.
Newcomb-Detroit Co., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Plummer Spray Equipment Co., Napolean, O.
Schmieg Industries, Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
Young & Bertke Co., Cincinnati, O.

BRAKES, SHEET METAL, HAND

Barth Mfg. Co., Milldale, Conn.
Dreis & Krump Mfg. Co., Chicago, Ill.
Eiker Mfg. Co., Ogallala, Neb.
Excelsior Tool & Machine Co., East St. Louis, Ill.
New Albany Machine Mfg. Co., New Albany, Ind.
Niagara Machine & Tool Works, Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.

St. Louis Tool Co., St. Louis, Mo.
Webb Machine & Tool Co., Imperial, Pa.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, PORTABLE

Barth Mfg. Co., Milldale, Conn.
Dreis & Krump Mfg. Co. Chicago, Ill.
Eiker Mfg. Co., Ogallala, Neb.
Harris, A. R., Hammond, Ind.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Webb Machine & Tool Co., Imperial, Pa.
Whitney Metal Tool Co., Rockford, Ill.

BRAKES, SHEET METAL, POWER

Bath Co., Cyril, The, Cleveland, O.
Cincinnati Shaper Co., Cincinnati, O.
Diamond Machine Tool Co., Pico, Calif.
Dreis & Krump Mfg. Co., Chicago, Ill.
Heartley Machine & Tool Co., Toledo, O
Munton Mfg. Co., Franklin Park, Ill.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Verson Allsteel Press Co., Chicago, Ill.
Verson Mfg. Co., The, Dallas, Tex.
Whitney Metal Tool Co., Rockford, Ill.

BRASS PIPE

See Pipe, Brass and Copper

BRASS TUBING

See Tubing, Brass and Copper

BRASS UNIONS

See Unions, Brass

BRASS VALVES

See Valves, Gate; and Valves, Globe

BRAZING TORCHES

See Torches, Brazing

BREAKERS, VACUUM (For Steam Using Equipment)

Bailey Co., Chas. M., San Francisco, Calif.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
McAlear Mfg. Co., Chicago, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Co., Indianapolis, Ind.
Webster & Co., Warren, Camden, N. J.

BRONZE VALVES

See Valves, Gate; and Valves, Globe

BUILDING INSULATION

See Insulation, Building

BURNERS, GAS, COMMERCIAL AND INDUSTRIAL

Automatic Firing Corp., St. Louis, Mo.
Barber Gas Burner Co., Cleveland, O.
Barton Co., Minneapolis, Minn.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Best Combustion Equipment Co., Inc., W. N., Carlstadt, N. J.
Bryant Corp., C. L., Cleveland, O
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Burdette Mfg. Co., Chicago, Ill.
Central States Mfg. Co., Inc., Arkansas City, Kan.
Certified Furnace Co., Div. Stainless & Steel Products Co., St. Paul, Minn.
Cleaver-Brooks Co., Milwaukee, Wis.
Coppus Engineering Corp., Worcester, Mass.
Dalzen Mfg. Co., St. Clair, Mich.
Eclipse Fuel Engrg. Co., Rockford, Ill.
Engineer Co., New York, N. Y.
Faber Engineering Co., Inc., Philadelphia, Pa.
Forney Engineering Co., Dallas, Tex.
Fuelgaurd Co., Dallas, Tex.
Gordon & Piatt, P. O. Box 331, Winfield, Kan.
Haney Gas Burner & Engineers, Monrovia, Calif.
Iron Fireman Mfg. Co., Cleveland, O.
Jackson & Church Co., Saginaw, Mich.
Jamieson Mfg. Co., Dallas, Tex.
Jerry Finn Engineers, St. Paul, Minn.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Kemp Mfg. Co., C. M., Baltimore, Md.
Kindl-Air Corp., Cleveland, O.
LaHarco Industries, Minneapolis, Minn.
Leahy Mfg. Co., Los Angeles, Calif.
Lientz Co., B. P., Kansas City, Mo.
Mahr Mfg. Co., Div., of Diamond Iron Wks., Inc., Minneapolis, Minn.
Martin Co., Inc., J. O., San Francisco, Calif.
Mettler Co., Inc., The, Los Angeles, Calif.
Mid-Continent Metal Products Co., Chicago, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Newcomb-Detroit Co., Detroit, Mich.
Norman Products Co., Inc., Columbus, O.
North American Mfg. Co., Cleveland, O.
Orr & Sembower, Inc., Reading, Pa.
Peabody Engrg. Corp., New York, N. Y.
Ray Oil Burner Co., San Francisco, Calif.
Rayfield, C. L., Chicago, Ill.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Rockwell Co., W. S., Fairfield, Conn.
Selas Corp. of America, Philadelphia, Pa.
Sellers Engineering Co., Chicago, Ill.
Siemon Mfg. Co., Kansas City, Mo.
Sonner Burner Co., Winfield, Kan.
Standard Fuel & Engineering Co., Detroit, Mich.
Staples & Pfeiffer, San Francisco, Calif.
Stout & Sons, David, St. Louis, Mo.
Sullivan Valve & Engineering Co., Butte, Mont.
Superior Combustion Industries, Inc., New York, N. Y.
Surface Combustion Corp., Toledo, O.
Thermapanels, Inc., San Jose, Calif.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.
Webster Engineering Co., Tulsa, Okla.
Will-Burt Co., Orrville, O.
Zink Co., John, Tulsa, Okla.
Zurn Mfg. Co., J. A., Industrial Div., Erie, Pa.

BURNERS, GAS, COMMERCIAL AND INDUSTRIAL, COMBINED WITH STOKER OR OVER COAL GRATES

Forney Engineering Co., Dallas, Tex.
Lientz Co., B. P., Kansas City, Mo.
Mettler Co., Inc., The, Los Angeles, Calif.

BURNERS, GAS AND OIL COMBINED, COMMERCIAL AND INDUSTRIAL

Ace Engineering Co., Chicago, Ill.
Automatic Firing Corp., St. Louis, Mo.
Babcock & Wilcox Co., New York, N. Y.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Best Combustion Equipment Co., Inc., W. N., Carlstadt, N. J.
Cleaver-Brooks Co., Milwaukee, Wis.
Coppus Engineering Corp., Worcester, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
Engineer Co., New York, N. Y.
Enterprise Engine & Machinery Co., Subsidiary of General Metals Corp., San Francisco, Calif.
Faber Engineering Co., Inc., Philadelphia, Pa.
Forney Engineering Co., Dallas, Tex.
Haney Gas Burner & Engineers, Monrovia, Calif.
Hauck Mfg. Co., Brooklyn, N. Y.
Iron Fireman Mfg. Co., Cleveland, O.
Johnson Co., S. T., Philadelphia, Pa. (high pressure atomizing)
Lammert & Mann Co., Chicago, Ill.
Leahy Mfg. Co., Los Angeles, Calif.
Lientz Co., B. P., Kansas City, Mo.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Mettler Co., Inc., The, Los Angeles, Calif.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Norman Products Co., Inc., Columbus, O.
North American Mfg. Co., Cleveland, O.
Orr & Sembower, Inc., Reading, Pa.
Peabody Engineering Corp., New York, N. Y.
Petro, Cleveland, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Quiet Automatic Oil Burner Corp., Newark, N. J.
Ray Oil Burner Co., San Francisco, Calif.
Rockwell Co., W. S., Fairfield, Conn.
Siemon Mfg. Co., Kansas City, Mo.
Simplex Oil Heating Corp., New York, N. Y.
Sonner Burner Co., Winfield, Kan.
Staffco Engrg. Corp., Chicago, Ill.
Staples & Pfeiffer, San Francisco, Calif.
Stout & Sons, David, St. Louis, Mo.
Superior Combustion Industries, Inc., New York, N. Y.
Surface Combustion Corp., Toledo, O.
Synchronous Flame, Inc., Chicago, Ill.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.
Webster Engineering Co., Tulsa, Okla.
Zink Co., John, Tulsa, Okla.

BURNERS, OIL, COMMERCIAL AND INDUSTRIAL

Ace Engineering Co., Chicago, Ill. (Rotary)
Airtemp, Div. of Chrysler Corp., Dayton, O.
Aldrich Co., Wyoming, Ill.
Anchor Div., Stratten & Terstegge Co., Inc., New Albany, Ind.
Auburn Burner Co., Auburn, Ind.
Automatic Firing Corp., St. Louis, Mo.
Babcock & Wilcox Co., New York, N. Y.
Beckett Corp., R. W., Elyria, O.
Best Combustion Equipment Co., Inc., W. N.; Carlstadt, N. J.
Century Engrg. Corp., Cedar Rapids, Ia.

Certified Furnace Co., Div. Stainless & Steel Products Co., St. Paul, Minn.
Chandler Co., Cedar Rapids, Ia.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Cleaver-Brooks Co., Milwaukee, Wis.
Coen Co., San Francisco, Calif.
Columbia Boiler Co., Pottstown, Pa.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill.
Dalmo-Victor Co., San Carlos, Calif.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Dewey-Shepard Boiler Co., Indianapolis, Ind. (high pressure)
Diamond Iron Works, Inc., Minneapolis, Minn. (High Pressure Atomizing)
Diesel Oil Burner Corp. of New York, Jamaica, Long Island, N. Y.
Drying Systems, Inc., Chicago, Ill.
Eckhart Mfg. Co., Inc., Union, N. J. (High pressure atomizing)
Eclipse Fuel Engineering Co., Rockford, Ill.
Engineering Co., New York, N. Y.
Enterprise Engine & Machine Co., Subsidiary of General Metals Corp., San Francisco, Calif.
Faber Engineering Co., Inc., Philadelphia, Pa.
Fano-Flame Oil Burner Corp., Huntington Park, Calif.
Federal Oil Burner Co., Inc., Philadelphia, Pa. (rotary)
Forney Engineering Co., Dallas, Tex. (both steam atomizing & mechanical, high pressure)
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Haney Gas Burner & Engineers, Monrovia, Calif. (steam atomizing)
Hardinge Oil Burner & Mfg. Co., Chicago, Ill.
Harvey-Whipple, Inc., Springfield, Mass.
Hauck Mfg. Co., Brooklyn, N. Y.
Iron Fireman Mfg. Co., Cleveland, O. (Rotary atomizing, high pressure atomizing)
Jackson & Church Co., Saginaw, Mich.
Johnson Co., S. T., Philadelphia, Pa. (Horizontal rotary)
Kleen-Heet, Inc., Chicago, Ill.
Kol-Master Corp., Oregon, Ill. (high pressure)
Lammert & Mann Co., Chicago, Ill.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y. (horizontal rotary belt & direct drives)
Leahy Mfg. Co., Los Angeles, Calif.
Lieblich Oil Burner Inc., New York, N. Y.
Lientz Co., B. P., Kansas City, Mo. (steam atomizing)
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Mettler Co., Inc., The, Los Angeles, Calif. (high pressure atomizing and steam atomizing)
Montag Stove & Furnace Works, Portland, Ore.
Mt. Hawley Mfg. Co., Inc., Peoria, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Oil Burner Co. of N. Y. Inc., Brooklyn, N. Y. (Horizontal rotary)
Norge Heat Div., Borg-Warner Corp., Kalamazoo, Mich.
North American Mfg. Co., Cleveland, O.
Nu-Way Corp., The, Rock Island, Ill.
Orr & Sembower, Inc., Reading, Pa. (air atomizing)
Peabody Engrg. Corp., New York, N. Y.
Petro, Cleveland, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
Quiet Automatic Oil Burner Corp., Newark, N. J. (high pressure atomizing)
Radiant Utilities Corp., Brooklyn, N. Y. (high pressure)
Ray Oil Burner Co., San Francisco, Calif. (High pressure atomizing rotary)
Rayfield Co., C. L., Chicago, Ill. (Low pressure atomizing and Horizontal Rotary)
Reif-Rexoil, Inc., Buffalo, N. Y.
Riley Stoker Corp., Worcester, Mass.
Rockwell Co., W. S., Fairfield, Conn.
Schurs Oil Burner Co., Los Angeles, Calif.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Siemon Mfg. Co., Kansas City, Mo.
Simplex Oil Heating Corp., New York, N. Y. (Low and high pressure atomizing, and horizontal rotary types)
Staffco Engrg. Corp., Chicago, Ill.
Staples & Pfeiffer, San Francisco, Calif. (High pressure and steam atomizing, variable capacity)
Sun-Ray Burner Mfg. Corp., Jamaica, N. Y.
Superior Combustion Industries, Inc., New York, N. Y. (rotary)
Synchronous Flame, Inc., Chicago, Ill.
Timken Silent Automatic Div., Timken-Detroit Axle Co., Jackson, Mich.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y. (Variable capacity, rotary, pressure atomizing, steam atomizing)
U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
United States Radiator Corp., Detroit, Mich.
Vapofier Corp., Chicago, Ill. (Pre-mixed gaseous fuel generator)
Webster Engineering Co., Tulsa, Okla.
Will-Burt Co., The, Orrville, O. (High pressure)
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
York-Shipley, Inc., York, Pa. (Rotary, high pressure atomizing)
Zink Co., John, Tulsa, Okla.

BURNERS, PULVERIZED COAL, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Whiting Corp., Harvey, Ill.

BURNERS, PULVERIZED COAL AND GAS, COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

BURNERS, PULVERIZED COAL, GAS AND OIL COMBINED

Babcock & Wilcox Co., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.

BURNERS, PULVERIZED COAL AND OIL, COMBINED, COMMERCIAL AND INDUSTRIAL

Babcock & Wilcox Co., New York, N. Y.
Blokolgas System, Inc., Detroit, Mich.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Engineer Co., New York, N. Y.
Foster Wheeler Corp., New York, N. Y.
Peabody Engineering Corp., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.

CABLE, ELECTRIC HEATING

General Electric Co., Construction Materials Div., Bridgeport, Conn.
Gro-Quick Co., Chicago, Ill.

CABLE, THERMOSTAT

Chester Cable Corp., Chester, N. Y.

CALCULATORS, AIR CONDITIONING, HEATING, VENTILATING, AND PIPING; SLIDE RULE

Calculator Specialties Co., Chicago, Ill.
Climatemaker Heat Loss Calculator Co., Bloomington, Ill.

CAPS, VENT FLUE

Accurate Sheet Metal Mfg. Works, Chicago, Ill.
Adams Co., The, Dubuque, Iowa
Airjet Ventilator Co., Pasadena, Calif.
Breidert Co., G. C., Los Angeles, Calif.
Excelsior Steel Furnace Co., The, Chicago, Ill.
General Ceramics & Steatite Corp., Keasbey, N. J. (acid proof)
Oil Equipment Mfg. Corp., New Haven, Conn.
Penn Ventilator Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Wallace Co., William, Metalbestos Div., Belmont, Calif.

CARBON DIOXIDE ANALYZERS

See Analyzers, Carbon Dioxide, Portable

CARBON DIOXIDE INDICATORS

See Indicators, Carbon Dioxide, Boiler Room

CARBON PIPE, TUBING, FITTINGS AND VALVES

See Pipe, Tubing, Fittings and Valves, Carbon and Graphite

CAST IRON PIPE

See Pipe, Cast Iron

CEMENT AND COMPOUNDS, PIPE JOINT

Acme Refining Co., The, Cleveland, O.
Acorn Refining Co., Cleveland, O.
Akron Metallic Gasket Co., Akron, O.
Arco Co., The, Cleveland, O.
Armite Laboratories, Los Angeles, Calif.
Atlas Chemical Co., Marietta, O.
Babbitt Chemical Specialties Co., New Bedford, Mass.
Baer Bros., New York, N. Y.
Black Magic Products Co., Tulsa, Okla.
Black & White Chemical Co., New York, N. Y.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., Roselle Park, N. J.
Bowser, Inc., Fort Wayne, Ind.
Cabot, Inc., Samuel, Boston, Mass.
Calbar Paint & Varnish Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chicago Gasket Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Products Co., Euclid, O.
Crane Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Croll & Son, Jesse G., Philadelphia, Pa.

Diamond Chemical Products, New York, N. Y.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Felt Products Mfg. Co., Chicago, Ill.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Gasoilair Equipment Co., New Haven, Conn.
Greene, Tweed & Co., North Wales, Pa.
Grinnell Co., Inc., Providence, R. I.
Hercules Chemical Co., Inc., New York, N. Y.
Hetzel Roofing Products Co., Newark, N. J.
Highside Chemicals Co., Clifton, N. J.
Horn Co., Inc., A. C., Long Island City, N. Y.
Illinois Oil Products, Inc., Rock Island, Ill.
Kenite Laboratory, Inc., Madison, N. J.
Key Co., East St. Louis, Ill.
Keystone Asphalt Products Co., Chicago, Ill.
Krehbiel Co., J. H., Chicago, Ill.
Lake Chemical Co., Chicago, Ill.
Lastik Products Co., Inc., Pittsburgh, Pa.
Macksons Co., New York, N. Y.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milwaukee Gas Specialty Co., Milwaukee, Wis.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Montgomery Bros., San Francisco, Calif.
National Engineering Products, Inc., Washington, D. C
Nebel Mfg. Co., Cleveland, O.
Oil Equipment Mfg. Corp., New Haven, Conn.
Parker Appliance Co., The, Cleveland, O.
Pecora Paint Co., Inc., Philadelphia, Pa.
Permatex Co., Inc., Brooklyn, N. Y.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sauereisen Cements Co., Pittsburgh, Pa.
Saverite Engineering Co., Hoboken, N. J.
Schundler & Co., F. E., Long Island City, N. Y.
Smooth-On Mfg. Co., Jersey City, N. J.
Sulflo, Inc., Elizabeth, N. J.
Technical Products Co., Sharpsburg, Pa.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
United States Stoneware Co., New York, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Wilhelm Co., A., Reading, Pa.
X Laboratories, Inc., New York, N. Y.
X-Pando Corp., Long Island City, N. Y.

CEMENT, DENSIFIERS FOR RADIANT PANELS

Lee-Don, Inc., Harmarville, Pa.

CEMENT, FURNACE

Acme Asbestos Covering & Flooring Co., Chicago, Ill
Armstrong Co., Detroit, Mich.
Armstrong Cork Co., Lancaster, Pa.
Babcock & Wilcox Co., New York, N. Y.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chicago Fire Brick Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Clinton Metallic Paint Co., Clinton, N. Y. (Asbestos)
Continental Products Co., Euclid, O.
Fireline Stove & Furnace Lining Co., Chicago, Ill.
Foster Co., Benjamin, Philadelphia, Pa.
Green Fire Brick Co., Mexico, Mo.
Hercules Chemical Co., Inc., New York, N. Y.
Hetzel Roofing Products Co., Newark, N. J.
Johns-Manville, New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Co., St. Louis, Mo.
Lastik Products Co., Inc., Pittsbrugh, Pa.
McLeod & Henry Co., Inc., Troy, N. Y.
Nebel Mfg. Co., Cleveland, O.
Pecora Paint Co., Inc., Philadelphia, Pa.
Plastic Products Co., Detroit, Mich.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Presstite Engineering Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sall Mountain Co., Hamilton, O.
Sauereisen Cements Co., Pittsburgh, Pa.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Tamms Industries, Inc., Chicago, Ill.
Taylor Sons Co., Charles, Cincinnati, O.
United States Stoneware Co., New York, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Walsh Refractories Corp., St. Louis, Mo.

CEMENT, INSULATING

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alton Mineral Wool Insulation Co., St. Louis, Mo.
Armstrong Cork Co., Lancaster, Pa.
Baldwin-Hill Co., Trenton, N. J. (mineral wool)
Bigelow-Liptak Corp., Detroit, Mich.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Carney Co., Inc., The, Mankato, Minn.
Chicago Fire Brick Co., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O.
Grant Wilson, Inc., Chicago, Ill.
Green Fire Brick Co., Mexico, Mo.
International Vermiculite Co., Girard, Ill.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa. (85 per cent magnesia)
Krehbiel Co., J. H., Chicago, Ill. (Asbestos, mineral wool)
Laclede-Christy Co., St. Louis, Mo.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Moore, Inc., Goodloe E., Danville, Ill.
Mundet Cork Corp., North Bergen, N. J.
Munn and Steele, Inc., South Boston, Mass.
National Engineering Products, Inc., Washington, D. C.
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Norristown Magnesia & Asbestos Co., Norristown, Pa.
Owens-Corning Fiberglas Corp., Toledo, O.
Pabco Products Inc., San Francisco, Calif.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Peterson Co., B. A., Dowagiac, Mich.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
Ruberoid Co., New York, N. Y.
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sall Mountain Co., Hamilton, O.
Sauereisen Cements Co., Pittsburgh, Pa.
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Mineral Wool Co., Stanhope, N. J.
Zonolite Co., Chicago, Ill.

CENTRIFUGAL PUMPS

See Pumps, Centrifugal

CHAIN DRIVES

See Drives, Chain

CHAMBERS, COMBUSTION, PREFORMED

Armstrong Cork Co., Lancaster, Pa.
Barclay, Inc., Robert, Chicago, Ill.
Boston Machine Works Co., Lynn, Mass.
Green Fire Brick Co., Mexico, Mo.
Henriksen Co., C. O., Chicago, Ill.
Laclede-Christy Co., St. Louis, Mo.
McLeod & Henry Co., Inc., Troy, N. Y.
Monogram Products Co., Inc., Philadelphia, Pa.
Oil Equipment Mfg. Corp., New Haven, Conn.
Peterson Co., B. A., Dowagiac, Mich.
Preferred Utilities Mfg. Corp., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y.
Rex Clay Products Co., Detroit, Mich.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Stuart Supply, Des Moines, Ia.
Walsh Refractories Corp., St. Louis, Mo.

CHAMBERS, TEST, CONTROLLED TEMPERATURE AND HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Anetsberger Brothers, Inc., Northbrook, Ill.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y.
Sub-Zero Products Co., Cincinnati, Ohio
Tenney Engineering, Inc., Newark, N. J.
York Corp., York, Pa.

CHANGERS, SPEED, HYDRAULIC COUPLING

American Blower Corp., Detroit, Mich.
CraneVeyor Corp., Los Angeles, Calif.
Link-Belt Co., Philadelphia, Pa.
Reuland Electric Co., Alhambra, Calif. (combined electric motor and fluid drive coupling)
Twin Disc Clutch Co., Rockford, Ill.

CHANGERS, SPEED, MAGNETIC

Doerr Electric Corp., Cedarburg, Wis.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Reliance Electric & Engineering Co., Cleveland, O.

CHANGERS, SPEED, MECHANICAL

Abart Gear & Machine Co., Chicago, Ill.

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Doall Co., The, Des Plaines, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
Doerr Electric Corp., Cedarburg, Wis.
Driv-Way Lite Co., Denver, Colo.
Graham Transmissions, Inc., Milwaukee, Wis.
Lewellen Mfg. Co., Columbus, Ind.
Lima Electric Motor Co., The, Lima, O.
Link-Belt Co., Philadelphia, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Master Electric Co., Dayton, O.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Reeves Pulley Co., Columbus, Ind.
Speed Selector Inc., Cleveland, O.
Standard Transmission Equipment Co., Pasadena, Calif.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Wayne Manufacturing Co., Pomona, Calif.
Webster Electric Co., Racine, Wis. (modulating drive for forced warm air heating systems)
White Mfg. Co., St. Paul, Minn.
Worthington Corp., Harrison, N. J.

CHASERS, PIPE AND BOLT

Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Inc., Waynesboro, Pa.
Ridge Tool Co., Elyria, O.
Saunders Mfg. Co., Yonkers, N. Y.
Toledo Pipe Threading Machine Co., Toledo, O.

CHASERS, THREADING DIE

Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Inc., Waynesboro, Pa.
Ridge Tool Co., Elyria, O.
Saunders Mfg. Co., Yonkers, N. Y.
Toledo Pipe Threading Machine Co., Toledo, O.

CHECK VALVES

See Valves, Check

CHILLERS, WATER, FOR AIR CONDITIONING AND REFRIGERATION

Acme Industries, Inc., Jackson, Mich.
Armstrong Co., Richard M., Westchester, Pa.
Baker Refrigeration Corp., South Windham, Me.
Bell & Gossett Co., Morton Grove, Ill.
Brown Fintube Co., The, Elyria, O.
Brunner Mfg. Co., Utica, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Dahlquist Mfg. Co. Inc., Div. of Process Engineering, Inc., Somerville, Mass.
Davis Engineering Corp., Elizabeth, N. J.
Dole Refrigerating Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Frick Co., Waynesboro, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, New York, N. Y.
Halstead & Mitchell, Pittsburgh, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Kewanee-Ross Corp., Kewanee, Ill.
Mayer Refrigerating Engineers, Inc., Rutherford, N. J.
McQuay, Inc., Minneapolis, Minn.
Niagara Blower Co., New York, N. Y.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y.
Refrigeration Economics Co., Inc., Canton, O.
Servel, Inc., Evansville, Ind.
Sims Co., Erie, Pa.
Taco Heaters, Inc., Providence, R. I.
Temprite Products Corp., Birmingham, Mich.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Vilter Mfg. Co., The, Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Whitlock Mfg. Co., Hartford, Conn.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Yula Water Heaters, Inc., New York, N. Y.

CIRCULATORS FOR HOT WATER HEATING SYSTEMS

Alliance Industries, Huntingden Valley, Pa.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Baseline Mfg. Co., Minneapolis, Minn.
Bell & Gossett Co., Morton Grove, Ill.
Columbus Steam Pump Works Co., Columbus, O.
Dayton Electric Mfg. Co., Chicago, Ill.
Fairbanks, Morse & Co., Chicago, Ill.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Kraissl Co., Inc., The, Hackensack, N. J.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Quality Specialty Co., Inc., Philadelphia, Pa.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Weil Pump Co., Chicago, Ill.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
White Flomatic Corp., Hoosick Falls, N. Y.

CLAMPS, BEAM, PIPE HANGING

Carpenter & Paterson, Inc., East Boston, Mass.
Chicago Nipple Mfg. Co., Cicero, Ill.
Crawford Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Frick Co., Waynesboro, Pa.
Gateway Engineering Co., Chicago, Ill.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Moore, Inc., Goodloe E., Danville, Ill.
National Valve & Mfg. Co., Pittsburgh, Pa.
Paine Co., Addison, Ill.
Rockwood Sprinkler Co., Worcester, Mass.
Unistrut Products Co., Chicago, Ill.
Walworth Co., New York, N. Y.

CLAMPS, HOSE

Allen Mfg. Co., W. D., Chicago, Ill.
Crane Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Flexible Tubing Corp., Guilford, Conn.
Independent Pneumatic Tool Co., Aurora, Ill.
Marman Products Co., Inc., Los Angeles, Calif.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Tinnerman Products, Inc., Cleveland, O.

CLAMPS, PIPE REPAIR

Adams Pipe Repair Products, El Monte, Calif.
Altens Foundry & Machine Works, Inc., Lancaster, O.
Chelsea Metal Stamping Co., New York, N. Y.
Chicago Specialty Mfg. Co., Chicago, Ill.
Clow & Sons, James B., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Jarecki Valve Div., of H. K. Porter Co., Inc., Tulsa, Okla.
Marman Products Co., Inc., Los Angeles, Calif.
Morris Coupling & Clamp Co., Ellwood City, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Ritter Pattern & Casting Co., Inc., New York, N. Y.
Skinner Co., M. B., South Bend, Ind.
Smooth-On Mfg. Co., Jersey City, N. J.
Yarnall-Waring Co., Philadelphia, Pa.

CLAMPS, PIPE, WELDING

Adjustable Clamp Co., Chicago, Ill.
Detroit Stamping Co., Detroit, Mich.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Jewel Mfg. Co., St. Paul, Minn.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Trindl Products, Ltd., Chicago, Ill.
Williams & Co., J. H., Buffalo, N. Y.

CLEANERS, AIR, ELECTRICAL

Air-Maze Corp., Cleveland, O.
American Air Filter Co., Inc., Louisville, Ky.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Dollinger Corp., Rochester, N. Y.
Lennox Furnace Co., Marshalltown, Ia.
Thermix Corp., The, Greenwich, Conn.
Trion, Inc., McKees Rocks, Pa.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

CLEANERS, TUBE

Airetool Mfg. Co., Springfield, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Elliott Co., Jeannette, Pa.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Osborn Mfg. Co., Cleveland, O.
Mill-Rose Co., Cleveland, O.
Perfection Grate & Stoker Co., Springfield, Mass.
Pierce Co., Wm. B., The, Buffalo, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Spencer Turbine Co., Hartford, Conn.
Wilson, Inc., Thomas C., Long Island City, N. Y.

CLEANERS, VACUUM, FOR BOILERS

Doyle Vacuum Cleaner Co., Grand Rapids, Mich.
Ideal Industries, Inc., Sycamore, Ill.
Lamson Corp., Blower Div., Syracuse, N. Y.
Pullman Vacuum Cleaner Co., Boston, Mass.
Spencer Turbine Co., Hartford, Conn.

CLEANING COMPOUNDS

See Compounds, Cleaning, Pipe Coil and Condenser

CLEANING COMPOUNDS, AIR FILTER

See Compounds, Cleaning, Air Filter

CLEANING MACHINES, PIPE

See Machines, Pipe Cleaning

CLOTH, TREATED, FOR DUST COLLECTORS

Menardi & Co., El Segundo, Calif.

COAL BURNERS

See Burners, Pulverized Coal; Stokers

COAL CONVEYORS

See Conveyors, Coal and Ash

COATINGS, PROTECTIVE, FOR METALS

Alrose Chemical Co., Providence, R. I.
Amercoat Corporation, South Gate, Calif.
American Chemical Paint Co., Ambler, Pa. (rust proofing chemicals)
American Hard Rubber Co., New York, N. Y. (hard & soft rubber)
American Solder & Flux Co., Philadelphia, Pa. (Galvanizing powder)
Armstrong Cork Co., Lancaster, Pa. (asphalt for weather & low temperatures)
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y. (Pitchbase)
Bart Mfg. Co., Inc., Belleville, N. J.
Blue Ridge Talc Co., Inc., Henry, Va.
Bonafide Genasco, Inc., New York, N. Y. (asphalt)
Brooklyn Varnish Mfg. Co., Brooklyn, N. Y.
Cabot Inc., Samuel, Boston, Mass. (Bituminuous black paint)
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O. (Asphalt and aluminum paints)
Colonial Alloys Co., Metals Div., Philadelphia, Pa. (anodizing chemical oxidizing for aluminum)
Condenser Service & Engineering Co., Inc., Hoboken, N. J. (Metal spray)
Cordo Chemical Co., Norwalk, Conn.
Corrosite Corp., New York, N. Y. (vinyl plastic)
Dampney Co., The, Boston, Mass.
Dearborn Chemical Co., Chicago, Ill. (Rust preventive)
Debevoise Co., The, Brooklyn, N. Y.
Dow Corning Corp., Midland, Mich.
du Pont de Nemours & Co. (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.
Eagle-Picher Co., Cincinnati, O. (Waterproof insulating, red lead and blue lead)
Elraco Engineering Co., Los Angeles, Calif. (interior tank paint)
Flintkote Co., The, New York, N. Y. (Asphalt emulsions)
Flexrock Co., Philadelphia, Pa.
Foster Co., Benjamin, Philadelphia, Pa.
Galv-Weld Products, Lima, O. (Regalvanizing)
Gates Engineering Co., Wilmington, Del.
Goodrich Co., B. F., Akron, O.
Haering & Co., Inc., D. W., San Antonio, Texas. (Drying and non drying)
Hague & Co., Alfred, Brooklyn, N. Y.
Hardy, Inc., Charles, New York, N. Y. (18-8 stainless steel paste)
Heresite & Chemical Co., Manitowoc, Wis. (Synthetic)
Horn Co., Inc., A. C., Long Island City, N. Y.
Houghton & Co., E. F., Philadelphia, Pa.
Industrial Metal Protectives, Inc., Dayton, O.
Interchemical Corp., Finishes Div., Newark, N. J.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Kellogg Co., M. W., The, New York, N. Y. (Heat resisting)
Knight, Maurice A., Akron, O. (Vinyl plastic base)
Koppers Co., Inc., Pittsburgh, Pa. (coal tar)
Lastik Products Co., Inc., Pittsburgh, Pa.
Lithcote Corp., Chicago, Ill.
Maas & Waldstein Co., Newark, N. J.
Markal Co., Chicago, Ill.
Master Mechanics Co., Cleveland, O.
Midland Paint & Varnish Co., Cleveland, O.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Miracle Adhesives, Corp., New York, N. Y.
Mortell Co., J. W., Kankakee, Ill. (Asphalt)
Mundet Cork Corp., North Bergen, N. J. (plastic waterproof paint)
National Lead Co., New York, N. Y. (Red lead)
National Pipe Coatings, Inc., Huntington Park, Calif.
Nebel Mfg. Co., Cleveland, O.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Nooter Corp., St. Louis, Mo. (Metal spray, lead burning alloy sheet)
Oakite Products, Inc., New York, N. Y.
Octagon Process, Inc., Staten Island, N. Y.
Ohmlac Paint & Refining Co., Inc., New York, N. Y. (Acid resistant, heat resistant)
Penn Galvanizing Co., Philadelphia, Pa. (Galvanizing)
Pennsylvania Salt Mfg. Co., Philadelphia, Pa. (chlorinated hydrocarbon base)
Perolin Co., Inc., Chicago, Ill.
Pittsburgh Plate Glass Co., Pittsburgh, Pa. (Paint, varnish, lacquer)
Porce-Lin Tank Lining Co., Detroit, Mich. (plastic & ceramic)
Presstite Engineering Co., St. Louis, Mo.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind. (Coal tar base)
Ric wiL Co., Cleveland, O.
Robertson Co., H. H., Pittsburgh, Pa.
Rubber & Plastics Compound Co., New York, N. Y.
Rust-Oleum Corp., Evanston, Ill.
Saran Lined Pipe Co., Ferndale, Mich.
Saverite Engineering Co., Hoboken, N. J. (Tank coatings, rust preventive)
Sherwin-Williams Co., The, Cleveland, O.
Sonneborn Sons, Inc., L., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga. (Metallic paint)
Special Chemicals Corp., New York, N. Y. (Aluminum paint)
Steelcote Mfg. Co., St. Louis, Mo.
Stewart-Warner Corp., Heating Div., Indianapolis, Ind. (ceramic)
Thompson & Co., Oakmont, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Turco Products, Inc., Los Angeles, Calif.
United Chromium, Inc., New York, N. Y. (Chemical resisting organic coatings)
United States Stoneware Co., New York, N. Y. (Corrosion resistant)
Watson-Standard Co., Pittsburgh, Pa.
Wilbur & Williams Co., Brighton, Mass.
Wilhelm Co., A., Reading, Pa.
Wolfe-Kote Co., Inc., Sheboygan, Wis.
X-Pando Corp., Long Island City, N. Y. (Anti-corrosive)

COCKS, BOILER GAGE

Bordo Co., Inc., L. J., Glenside, Pa.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Ernst Water Column & Gauge Co., Livingston, N. J.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Penberthy Injector Co., Detroit, Mich.
Powell Co., Wm., The, Cincinnati, O.
Reliance Gauge Column Co., Cleveland, O.
Strahman Valves, Inc., New York, N. Y.
Swift Lubricator Co., Elmira, N. Y.
Williams Gauge Co., The, Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich.

COILS

See Surface, Cooling; Surface, Heating

COILS, CONDENSATION

American District Steam Co., Inc., North Tonawanda, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
General Fittings Co., Providence, R. I.
Lewis & Co., Joseph E., Baltimore, Md.
Parker Appliance Co., The, Cleveland, O.
Trane Co., The, La Crosse, Wis.
Vilter Mfg. Co., The, Milwaukee, Wis.
Yula Water Heaters, Inc., New York, N. Y.

COILS, FOR HOT WATER STORAGE TANKS

Adams Co., The, Dubuque, Ia.
Alstrom Corp., Bronx, N. Y.
American Cooling Tower Co., Kansas City, Mo.
American District Steam Co., Inc., North Tonawanda, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Downingtown Iron Works, Downingtown, Pa.
Everhot Products Co., Chicago, Ill.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., Chicago, Ill.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Kewanee-Ross Corp., Kewanee, Ill.
Kold-Hold Mfg. Co., Lansing, Mich.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pittsburgh Nipple Wks., Inc., Pittsburgh, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Quaker City Iron Wks., Philadelphia, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Sims Co., Erie, Pa.
Taco Heaters, Inc., Providence, R. I.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

COILS AND PANELS, RADIANT HEATING AND COOLING, PREFABRICATED

Atlantic Pipe Bending and Fabricating Corp., Edgewater, N. J.
Bradfield, Jos. L., Indianapolis, Ind. (headers)
Burgess-Manning Co., Chicago, Ill. (also for radiant cooling)
Capitol Mfg. & Supply Co., Columbus, O.
Clow & Sons, James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Crittall Radiant Heating, Inc., Richard, New York, N. Y.
Even-Ray Co., Inc., Newark, N. J.
Fricke, Fred J., Albuquerque, N. M.
Kritzer Radiant Coils, Inc., Chicago, Ill.
Meco, Inc., Portland, Ore.
National Pipe Bending Co., New Haven, Conn.
Pan-L-Heat Corp., Portland, Ore.
Radiant Heat Engineering, Inc., Pasadena, Calif.
Radiant Panel Mfg. Co., Torrington, Conn.
Simplex Ceiling Corp., New York, N. Y.
T & H Engineering Co., Little Ferry, N. J. (hammer and holding rig for installing ceiling heating coils)
Thermapanels, Inc., San Jose, Calif.

COILS, PIPE

Acme Industries, Inc., Jackson, Mich.
Albert Pipe & Supply Co., Brooklyn, N. Y.
American Cooling Towers Co., Kansas City, Mo.
Atlantic Pipe Bending and Fabricating Corp., Edgewater, N. J.
B & M Mfg. Co., East Orange, N. J.
Baker Refrigeration Corp., South Windham, Me.
Capitol Mfg. & Supply Co., Columbus, O.
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J
Crane Co., Chicago, Ill.
Davis Engineering Corp., Elizabeth, N. J.
Division Lead Co., Chicago, Ill.
Edwards Engineering Corp., Pompton Plains, N. J.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y. (lead, lead covered, and lead alloy)
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Flori Pipe Co., The, St. Louis, Mo.
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
Harris & Co., Arthur, Chicago, Ill.
Heil Process Equipment Corp., Cleveland, O. (Impervious Graphite)
Kold-Hold Mfg. Co., Lansing, Mich.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Lewis & Co., Joseph E., Baltimore, Md.
Lumsden & Van Stone, Div. of Midwest Piping & Supply Co., South Boston, Mass.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
National Pipe Bending Co., New Haven, Conn.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Pressed Steel Co., Wilkes-Barre, Pa.
Radiant Heat Engineering, Inc., Pasadena, Calif.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Rempe Co., Chicago, Ill.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Sawhill Mfg. Co., Sharon, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Shaw-Kendall Engineering Co., Toledo, O.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Western Piping & Engineering Co., Inc., San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.

COLLECTION, DUST AND FUME, ULTRASONIC

Ultrasonic Corp., Cambridge, Mass.

COLLECTORS, DUST

Aerotec Corp., The, Greenwich, Conn.
Aget-Detroit Co., Ann Arbor, Mich.
Allington & Curtis Mfg. Co., Saginaw, Mich. (centrifugal & bag)
American Air Filter Co., Inc., Louisville, Ky.
American Blower Corp., Detroit, Mich.
American Wheelabrator & Equipment Corp., Mishawaka, Ind. (cloth tube type)
Blower Application Co., Milwaukee, Wis.
Bubar Dust Systems, Inc., Old Lyme, Conn. (mechanical)
Buffalo Forge Co., Buffalo, N. Y. (wet & dry)
Carolina Blower Co., Inc., Greensboro, N. C.
Centri-Spray Corp., Detroit, Mich. (Wet type)
Chicago Blower Corp., Franklin Park, Ill. (centrifugal)
Cincinnati Electrical Tool Co., The, Cincinnati, O. (self contained)
Clark Dust Control Co., Chicago, Ill.
Columbian Steel Tank Co., Kansas City, Mo.
Day Co., The, Minneapolis, Minn.
Diamond Power Specialty Corp., Lancaster, O.
Doall Co., The, Des Plaines, Ill.
Ducon Co., Mineola, N. Y.
Dust Filter Co., Chicago, Ill.
Dust Suppression & Engineering Co., Lake Orion, Mich.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Goethel Sheet Metal Wks., Alfred, Milwaukee, Wis.
Green Fuel Economizer Co., Beacon, N. Y. (dry type)
Griffin & Co., Inc., Louisville, Ky.
Indiana Fan Company, Indianapolis, Ind.
Jacobs Co., B. & J., Cincinnati, O.
Kirk & Blum Mfg. Co., Cincinnati, O.
Kluegel & Co., E., St. Paul, Minn.
Koppers Co., Inc., Metal Products Div., Baltimore, Md., (electrostatic precipitator)
Lamson Corp., Blower Div., Syracuse, N. Y.
Lumm Co., A. H., Toledo, O.
Mahon Co., R. C., The, Detroit, Mich. (dry inertia, air washers, fog filters)
Newcomb-Detroit Co., Detroit, Mich. (recirculating water type)
Northern Blower Co., Cleveland, O.
Omega Machine Co., Div. of Builders Iron Foundry, Providence, R. I. (bag type)
Pangborn Corp., Hagerstown, Md. (cloth filter)
Peters-Dalton, Inc., Detroit, Mich.
Prat-Daniel Corp., East Port Chester, Conn.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Research Corp., New York, N. Y.
Ruemelin Mfg. Co., Milwaukee, Wis.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Schmieg Industries, Detroit, Mich.
Schneible Co., Claude B., Detroit, Mich.
Sly Mfg. Co., W. W., Cleveland, O.
Spencer Turbine Co., Hartford, Conn.
Sprout-Waldron & Co., Muncy, Pa.
Thermix Corp., The, Greenwich, Conn.
Torit Mfg. Co., St. Paul, Minn. (cloth filter and centrifugal separator)
Wagner Awning & Mfg. Co., Cleveland, O. (Dust recovery bags)
Western Blower Co., Seattle, Wash.
Western Precipitation Corp., Los Angeles, Calif.
Whiting Corp., Harvey, Ill.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
Young & Bertke Co., Cincinnati, O.

COLORIMETERS

American Instrument Co., Inc., Silver Spring, Md.
Bausch & Lomb Optical Co., Rochester 2, N. Y.
Dagger & Co., A., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Photovolt Corp., New York, N. Y.
Refinite Corp., Omaha, Neb.
Will Corp., Rochester, N .Y.

COMBUSTION CHAMBERS

See Chambers, Combustion, Preformed

COMBUSTION CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion, Systems, Combustion Control

COMBUSTION RECORDERS

See Recorders, Carbon Dioxide

COMBUSTION TESTING KITS

See Kits, Combustion Testing; Analyzers, Carbon Dioxide, Portable; Testers, Smoke

COMPOUNDS, AIR FRESHENING

Air-Aid Corp., Boston, Mass.
Aireactor Corp., New York, N. Y.
Air Vent Corp., New York, N. Y.
Airkem, Inc., New York, N. Y.
Ampion Corp., Long Island City, N. Y.
Lord & Clark Co., Inc., Boston, Mass.

COMPOUNDS, BOILER CLEANING

Agava Products, Inc., Jersey City, N. J.
Agnew & Tomlinson, Long Island City, N. Y.
American Chemical Paint Co., Ambler, Pa.
American K. A. T. Corp., Garwood, N. J.
American Sand-Barium Co., Inc., New York, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird Archer Co., Philadelphia, Pa.
Black & White Chemical Co., New York, N. Y.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Cambridge, Mass.
Chemical Engineering Co., Dallas, Tex.
Chemical Solvent Co., Birmingham, Ala.

Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Diamond Chemical Products, New York, N. Y.
Dowell Inc., Tulsa, Okla.
Elraco Engineering Co., Los Angeles, Calif.
Ferro-Nil Corp., New York, N. Y.
Grief, Edward C., Bogota, N. J.
Haering & Co., Inc., D. W., San Antonio, Tex.
Hagan Corp., Pittsburgh, Pa.
Hercules Chemical Co., Inc., New York, N. Y.
Hood Refining Co., Greensburg, Pa.
Houghton & Co., E. F., Philadelphia, Pa.
Kenite Laboratory, Inc., Madison, N. J.
Kewanee-Ross Corp., Kewanee, Ill.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Krehbiel Co., J. H., Chicago, Ill.
MacDermid Chemical Co., Bristol, Conn.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Moreheat Distribution, Inc., Cincinnati, O.
North American Fibre Products Co., The, Cleveland, O.
O'Brien Industries, Caldwell, N. J.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Perolin Co., Inc., Chicago, Ill.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.
Squires Co., C. E., The, Cleveland, O.
Strong, Carlisle & Hammond Co., Cleveland, O.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn, N. Y.
Vinco Co., Inc., The, New York, N. Y.
Warren Refining & Chemical Co., The, Cleveland, O.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Co. of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
X Laboratories, Inc., New York, N. Y.

COMPOUNDS, BOILER AND RADIATOR SEALING

Ampion Corp., Long Island City, N. Y.
Arco Co., The, Cleveland, O.
Atlas Chemical Co., Marietta, O.
Black & White Chemical Co., New York, N. Y.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Cambridge, Mass.
Chemical Solvent Co., Birmingham, Ala.
Chicago Specialty Mfg Co., Chicago, Ill.
Desolvo Co., The, Pittsburgh, Pa.
Diamond Chemical Products, New York, N. Y.
Hampton-Cross Co., The, Louisville, Ky.
Hercules Chemical Co., Inc., New York, N. Y.
Kenite Laboratory, Inc., Madison, N. J.
Krehbiel Co., J. H., Chicago, Ill.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Engineering Products, Inc., Washington, D. C.
Quigley Co., Inc., New York, N. Y.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Utility Laboratory, Inc., Brooklyn, N. Y.
Vinco Co., Inc., The, New York, N. Y.
X Laboratories, Inc., New York, N. Y.

COMPOUNDS, CLEANING, AIR FILTER

Carbide and Carbon Chemicals Div., Union Carbide and Carbon Corp., New York, N. Y.
National Aniline Div., Allied Chemical & Dye Corp., New York, N. Y.
Oakite Products, Inc., New York, N. Y.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Turco Products, Inc., Los Angeles, Calif.

COMPOUNDS, CLEANING, PIPE COIL AND CONDENSER

American Chemical Paint Co., Ambler, Pa.
Anderson-Stolz Corp., Kansas City, Mo.
Apex All Weather Products, Chicago, Ill.
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird-Archer Co., Philadelphia, Pa.
Blue Seal Chemical Co., Roselle Park, N. J.
Cannon Chemical Co., Inc., Cambridge, Mass.
Carolina Aniline & Extract Co., Inc., Charlotte, N. C.
Chemical Engineering Co., Dallas, Tex.
Chemical Solvent Co., Birmingham, Ala.
Dearborn Chemical Co., Chicago, Ill.
Dowell, Inc., Tulsa, Okla.
Elraco Engineering Co., Los Angeles, Calif.
Haering & Co., Inc., D. W., San Antonio, Tex.
Hercules Chemicals Co., Inc., New York, N. Y.
MacDermid Chemical Co., Bristol, Conn.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y
National Aniline Div., Allied Chemical & Dye Corp., New York, N. Y.
North American Fibre Products Co., The, Cleveland, O.
Oakite Products, Inc., New York, N. Y.
Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Perolin Co., Inc., Chicago, Ill.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Turco Products, Inc., Los Angeles, Calif.
Water Treatment Co., of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.

COMPOUNDS, WELDING

Acme White Lead & Color Wks., Detroit, Mich.
Allen Co., Inc., L. B., Chicago, Ill.
Allied Weld-Craft, Inc., Indianapolis, Ind.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Aluminum Co. of America, Pittsburgh, Pa.
American Solder & Flux Co., Philadelphia, Pa.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Marquette Mfg. Co., Minneapolis, Minn.
Metal & Thermit Corp., New York, N. Y.
Midland Paint & Varnish Co., Cleveland, O.
Modern Engineering Co., St. Louis, Mo.
Powder Weld Process Co., The, Brooklyn, N. Y. (Powdered)
Presstite Engineering Co., St. Louis, Mo.
Sight Feed Generator Co., West Alexandria, O.
Special Chemicals Corp., New York, N. Y.
Thompson & Co., Oakmont, Pa.
Turco Products, Inc., Los Angeles, Calif.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

COMPRESSED AIR DEHUMIDIFIERS

See Dehumidifiers for Compressed Air

COMPRESSED AIR MOTORS

See Motors, Compressed Air Powered

COMPRESSOR BASES

See Bases and Pads, Vibration Isolating

COMPRESSORS, AIR

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Beach-Russ Co., New York, N. Y.
Binks Mfg. Co., Chicago, Ill.
Brunner Mfg. Co., Utica, N. Y.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Cooper-Bessemer Corp., Mt. Vernon, O.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davey Compressor Co., Kent, O.
Dayton Air Compressor Co., The, Dayton, O.
DeVilbiss Co., The, Toledo, O.
Electric Sprayit Co., The, Sheboygan, Wis.
Essick Mfg. Co., Los Angeles, Calif.
Fuller Co., Catasaqua, Pa.
Gardner-Denver Co., Quincy, Ill.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gray Co., Inc., Minneapolis, Minn.
Ingersoll-Rand Co., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Joy Mfg. Co., Pittsburgh, Pa.
Lammert & Mann Co., Chicago, Ill.
Lamson Corp., Blower Div., Syracuse, N. Y.
Lynch Corp., Toledo, O.
M & E Mfg. Co., Indianapolis, Ind.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Nash Engineering Co., South Norwalk, Conn.
North Penn Co., New York, N. Y.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Roots-Connersville Blower Div., Connersville, Ind.
Schramm, Inc., West Chester, Pa.
Spencer Turbine Co., Hartford, Conn.
Union Steam Pump Co., Battle Creek, Mich.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Wayne Pump Co., Fort Wayne, Ind.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Co., K. R., Buffalo, N. Y.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

COMPRESSORS, REFRIGERATING, CENTRIFUGAL

Carrier Corp., Syracuse, N. Y. (Carrene)
Trane Co., The, LaCrosse, Wis.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp. York, Pa.

COMPRESSORS, REFRIGERATING, COMBINED WITH CONDENSER, WATER CHILLER, PIPING CONNECTIONS, AND CONTROLS

Brunner Mfg. Co., Utica, N. Y.
Carrier Corp., Syracuse, N. Y.

Diceler Div. of General Machine & Mfg. Co., Berwick, Pa.
Frick Co., Waynesboro, Pa.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Tecumseh Products Co., Tecumseh, Mich.
Trane Co., The, La Crosse, Wis.
Vilter Mfg. Co., The, Milwaukee, Wis.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

COMPRESSORS, REFRIGERATING, RECIPROCATING

Baker Refrigeration Corp., South Windham, Me. ("Freon," Methyl chloride, Ammonia)
Blissfield Mfg. Co., Blissfield, Mich.
Brunner Mfg. Co., Utica, N. Y. (Methyl chloride, "Freon," sulphur dioxide)
Carrier Corp., Syracuse, N. Y. ("Freon")
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O. (Radial)
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Copeland Refrigeration Corp., Sidney, O.
Curtis Refrigeration Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Diceler Div. of General Machine & Mfg. Co., Berwick, Pa.
Frick Co., Waynesboro, Pa. (Ammonia, "Freon")
Frigidaire Div., General Motors Corp., Dayton, O.
General Machinery Co., Spokane, Wash.
Howe Ice Machine Co., Chicago, Ill. ("Freon," ammonia, methyl chloride)
Ingersoll-Rand Co., New York, N. Y.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Div., Nash-Kelvinator Corp., Detroit, Mich.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Mills Industries, Inc., Chicago, Ill.
Ready-Power Co., The, Detroit, Mich. (radial unit driven by direct-connected internal combustion engine)
Reliance Refrigerating Machine Co., Chicago, Ill. ("Freon," methyl chloride, ammonia)
Reynolds Mfg. Co., Inc., Springfield, Mo.
Schnacke, Inc., Evansville, Ind.
Servel, Inc., Evansville, Ind.
Stewart Ice Machine Co., Pomona, Calif.
Tecumseh Products Co., Tecumseh, Mich.
Trane Co., The, LaCrosse, Wis.
U. S. Thermo Control Co., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis. ("Freon" ammonia)
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wittenmeier Machinery Co., Chicago, Ill. (Carbon dioxide)
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill. (Ammonia, methyl chloride and "Freon")
York Corp., York, Pa. (Carbon dioxide, ammonia, "Freon")

COMPRESSORS, REFRIGERATING, STEAM JET

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engrg. Co., Inc., New York, N. Y.
Graham Mfg. Co., Inc., New York, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Kewanee-Ross Corp., Kewanee, Ill.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.

COMPRESSORS, STEAM BOOSTER

Bury Compressor Co., Erie, Pa.
Graham Mfg. Co., Inc., New York, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Joy Mfg. Co., Pittsburgh, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Worthington Corp., Harrison, N. J.

CONCRETE, INSULATING, FOR UNDERGROUND PIPING

Forty-Eight Insulations, Inc., Aurora, Ill.
Munn and Steele, Inc., South Boston, Mass.
Zonolite Co., Chicago, Ill.

CONDENSATE DISPOSAL UNITS

See Units, Condensate Disposal

CONDENSATE RETURN

See Pumps, Condensation Return; Systems, Condensate Return

CONDENSATION METERS

See Meters, Condensation

CONDENSATION PUMPS

See Pumps, Condensation

CONDENSER TUBES

See Tubes, Condenser

CONDENSERS, REFRIGERATING, AIR COOLED

Drayer-Hanson, Inc., Los Angeles, Calif. (1 to 10 tons)
Fedders-Quigan Corp., Buffalo, N. Y.
Heat-X-Changer Co., The, Brewster, N. Y. (1/3 hp to 5 hp)
Kramer Trenton Co., Trenton, N. J.
Marlo Coil Co., St. Louis, Mo. (1 to 20 tons)
Peerless of America, Inc., Chicago, Ill.
Vilter Mfg. Co., The, Milwaukee, Wis.

CONDENSERS, REFRIGERATING, EVAPORATIVE

Acme Industries, Inc., Jackson, Mich.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
American Cooling Tower Co., Kansas City, Mo.
Baker Refrigeration Corp., South Windham, Me.
Baltimore Aircoil Co., Inc., Baltimore, Md.
Buffalo Forge Co., Buffalo, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y. ("Freon," ammonia)
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crowell & Dunn, Inc., New York, N. Y.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer-Hanson, Inc., Los Angeles, Calif.
Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
G & O Mfg. Co., New Haven, Conn.
Governair Corp., Oklahoma City, Okla.
Harry Cooling Towers, Inc., New York, N. Y.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Nevinger Mfg. Co., Inc., Greenville, Ill.
Niagara Blower Co., New York, N. Y.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Servel, Inc., Electric Refrigeration Div., Evansville, Ind.
Schnacke, Inc., Evansville, Ind.
Super-Cold Corp., Los Angeles, Calif.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
XL Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

CONDENSERS, REFRIGERATING, SHELL AND COIL

Acme Industries, Inc., Jackson, Mich.
American Coils Co., Newark, N. J.
Armstrong Co., Richard M., Westchester, Pa.
Autorad Inc., Chicago, Ill.
Baker Refrigeration Corp., South Windham, Me.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davis Engineering Corp., Elizabeth, N. J.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
General Fittings Co., Providence, R. I.
Halstead & Mitchell, Pittsburgh, Pa. (Double tube)
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Heil Process Equipment Corp., Cleveland, O.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Nevinger Mfg. Co., Inc., Greenville, Ill.
Nooter Corp., St. Louis, Mo.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y.
Refrigeration Economics Co., Inc., Canton, O.
Rome-Turney Radiator Co., Rome, N. Y.
Super-Cold Corp., Los Angeles, Calif.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Whitlock Mfg. Co., Hartford, Conn.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., New York, N. Y.

CONDENSERS, REFRIGERATING, SHELL AND TUBE

Acme Industries, Inc., Jackson, Mich.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Coils Co., Newark, N. J.
Andale Co., Philadelphia, Pa.
Autorad Inc., Chicago, Ill.
Armstrong Co., Richard M., Westchester, Pa.
Baker Refrigeration Corp., South Windham, Me.
Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Works Co., E., Akron, O.
Brown Fintube Co., The, Elyria, O.
Carrier Corp., Syracuse, N. Y. (Carrene)
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Frick Co., Waynesboro, Pa.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kewanee-Ross Corp., Kewanee, Ill.
Kramer Trenton Co., Trenton, N. J.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Manning & Lewis Engineering Co., Newark, N. J.
National Radiator Co., The, Johnstown, Pa.
Nevinger Mfg. Co., Inc., Greenville, Ill.
Nooter Corp., St. Louis, Mo.
Ohio Pipe Bending & Machine Co., Cleveland, O.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y.
Refrigeration Economics Co., Inc., Canton, O.
Reliance Refrigerating Machine Co., Chicago, Ill.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Roessing Mfg. Co., Pittsburgh, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Schnacke, Inc., Evansville, Ind.
Standard Refrigeration Co., Chicago, Ill.
Stewart Ice Machine Co., Pomona, Calif.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Union Steam Pump Co., Battle Creek, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Whitlock Mfg. Co., Hartford, Conn.
Wittenmeier Machinery Co., Chicago, Ill.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., New York, N. Y.

CONDENSERS, WATER DISTRIBUTORS FOR

See Distributors, Water, for Condensers

CONDENSING UNITS

See Compressors

CONDUCTORS AND PANELS, ELECTRICAL, FOR RADIANT HEATING

Appleman Glass Works, Bergenfield, N. J.
Continental Radiant Glass Heating Corp., New York, N. Y.
Electradiant Corp., Monterey, Calif.
Electriglas Corp., Bergenfield, N. J. (electric glass panels)
Electrofilm Corp., North Hollywood, Calif.
Roberson Co., L. N., Seattle, Wash.
United States Rubber Co., New York, N. Y.
Wiegand Co., Edwin L., Pittsburgh, Pa.

CONDUIT, UNDERGROUND PIPING

Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Dockstader, Inc., S. E., Washington, D. C.
Durant Insulated Pipe Co., Palo Alto, Calif.
Durant International Corp., Williamstown, N. J.
Johns-Manville, New York, N. Y.
Kaiser Co., E. B., Chicago, Ill.
Michigan Pipe Co., Bay City, Mich.
Orangeburg Mfg. Co., Orangeburg, N. Y.
Porter & Co., Inc., H. W., Newark, N. J.
Ric-wiL Co., Cleveland, O.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Stillwater Clay Products Co., The, Cleveland, O.
Water Tight Underground Conduit, Houston, Tex.

CONNECTIONS, DUCT, FLEXIBLE (ASBESTOS, CANVAS, ETC.)

Canvas Products Co., St. Louis, Mo.
Felters Company, The, Boston, Mass.
Flexonics Corp., Maywood, Ill.
Grant Wilson Inc., Chicago, Ill.
Iden Associates, Chicago, Ill.
Polyken Industrial Tape Dept., Bauer & Black, Div. of the Kendall Co., Chicago, Ill.
St. Clair Rubber Co., Detroit, Mich.
United States Rubber Co., New York, N. Y.
Wagner Awning & Mfg. Co., Cleveland, O.

CONNECTORS, FILLING, HYDROSTATIC TEST

Mechanical Products Corp., Chicago, Ill.
Roylyn, Inc., Glendale, Calif.

CONNECTORS, FOR NON-METALLIC DUCT FABRICATION

Acme Steel Co., Chicago, Ill. (Strapping)
Lumm Co., A. H., Toledo, O.
Sheetlock Co., Chicago, Ill.
United States Rubber Co., New York, N. Y.

CONTINUOUS HEATERS

See Heaters, Steam Jet, for Liquids

CONTROL, FOR INDIRECT WATER HEATERS

Barber-Colman Co., Rockford, Ill.
Bell & Gossett Co., Morton Grove, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Controls Corp., The, Detroit, Mich.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Klipfel Valves, Inc., Hamilton, O.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Watts Regulator Co., Lawrence, Mass.

CONTROL SYSTEMS, PRE-ASSEMBLED AS UNITS, FOR HEATING, COOLING AND VENTILATING

Factory Assemblies Using Other Manufacturers' Valves, Thermostats, Damper Motors, etc.

American Moistening Co., Providence, R. I.
Automatic Devices Co., Inc., Western Springs, Ill.
Bahnson Co., Winston-Salem, N. C.
Carvell Heat Equipment Co., Los Angeles, Calif.
Dunham Co., C. A., Chicago, Ill.
Illinois Engineering Co., Chicago, Ill.
Master Control Co., The, Cuyahoga Falls, O.
Midwest Automatic Control Co., Des Moines, Ia.
Ray Oil Burner Co., San Francisco, Calif.

CONTROLLERS AND STARTERS, MOTOR

Allen-Bradley Co., Milwaukee, Wis.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elec. Co., Hartford, Conn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
B/W Controller Corp., Birmingham, Mich.
Borg-Erickson Corp., Chicago, Ill.
Chase-Shawmut Co., Newburyport, Mass.
Clark Controller Co., Cleveland, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Electric Controller & Mfg. Co., Cleveland, O.
Electric Machinery Mfg. Co., Minneapolis, Minn. (Synchronous motor)
Fitch, Allen & Co., Chicago, Ill.
Furnas Electric Co., Batavia, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Ideal Electric & Mfg. Co., Mansfield, O.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Monitor Controller Co., The, Boston, Mass.
Penn Controls, Inc., Goshen, Ind.
Redmond Co., Inc., Owosso, Mich.
Reynolds Electric Co., River Grove, Ill.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Square D Co., Detroit, Mich.
Trumbull Dept., General Electric Co., Plainville, Conn.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
Zenith Electric Co., Chicago, Ill.

CONTROLS, AIR CONDITIONING

See Humidistats; Indicator-Controllers; Operators, Damper; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Thermostats; Valves, Diaphragm; Valves, Refrigeration; Valves, Solenoid

CONTROLS, DOOR, ELECTRIC EYE (FOR AIR CONDITIONED ROOMS)

De-Tec-Tronic Laboratories, Inc., Chicago, Ill.
Stanley Works, The, New Britain, Conn.
Sterns-Flinn Corp., New York, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.

CONTROLS, DRAFT, BAROMETRIC

A P Controls Corp., Milwaukee, Wis.
Ace Instrument Co., Inc., Brooklyn, N. Y.
Barber-Colman Co., Rockford, Ill.
Boston Machine Works Co., Lynn, Mass.
Bristol Co., The. Waterbury, Conn.
Cleveland Fuel Equipment Co., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Combustion Equipment Co., Rock Island, Illinois
Empire Ventilation Equipment Co., Long Island City, N. Y.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Fuelguard Co., Dallas, Tex.
Hotstream Heater Co., Cleveland, O.
Krueger Sentry Gauge Co., Green Bay, Wis.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Perfex Corp., Milwaukee, Wis.
Preferred Utilities Mfg. Corp., New York, N. Y.
Salina Metal Products Co., Salina, Kan.
Sarcotherm Controls, Inc., New York, N. Y.
Simplex Mfg. Co., Fond du Lac, Wis.
Windmaster Corp., Columbus, O.

CONTROLS, FIRE PROTECTION SPRINKLER SYSTEMS

Allen Mfg. Co., W. D., Chicago, Ill.
American District Telegraph Co., New York, N. Y.
Automatic Control Co., St. Paul, Minn.
Barber-Colman Co., Rockford, Ill.
Blaw Knox Construction Co., Power Piping and Sprinkler Div., Pittsburgh, Pa.
Clark Controller Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Synchro-Start Products, Inc., Skokie, Ill.
Worner Electronic Devices, Rankin, Ill.

CONTROLS, FLAME FAILURE

American District Telegraph Co., New York, N. Y.
Bristol Co., The, Waterbury, Conn.
Combustion Control Corp., Cambridge, Mass.
De-Tec-Tronic Laboratories, Inc., Chicago, Ill.
Drying Systems, Inc., Chicago, Ill.
Ess Specialty Corp., Bergenfield, N. J.
Fenwal Inc., Ashland, Mass.
Fuelguard Co., Dallas, Tex.
General Controls Co., Glendale, Calif.
Haney Gas Burner & Engrs., Monrovia, Calif.
Mercoid Corp., The, Chicago, Ill.
Mettler Co., Inc., The, Los Angeles, Calif.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneaoplis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Webster Engineering Co., Tulsa, Okla.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
White Mfg. Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis, Mo.

CONTROLS, HEATING

See Alarms; Humidistats; Indicator-Controllers; Operators, Damper; Operators, Valve; Recorder-Controllers; Regulators; Relays; Switches; Systems, Combustion Control; Systems, Heating; Thermostats; Valves, Balancing, Radiator; Valves, Diaphragm; Valves, Flow Control; Valves, Mixing; Valves, Pressure Reducing and Regulating; Valves, Radiator; Valves, Solenoid

CONTROLS, PUSH-PULL

See Shafts, Flexible, Push-Pull, for Control

CONTROLS, REFRIGERATION

See Humidistats; Operators, Valve; Relays; Switches; Thermostats; Valves, Refrigeration; Valves, Solenoid

CONVECTORS

See Radiation, Convection Type

CONVERTORS, STEAM

American District Steam Co., Inc., North Tonawanda, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Manning & Lewis Engineering Co., Newark, N. J.
Richmond Engineering Co., Inc., Richmond, Va.
Yula Water Heaters, Inc., New York, N. Y.

CONVEYORS, COAL AND ASH

Ajax Flexible Coupling Co., Westfield, N. Y.
American Coal Burner Co., Chicago, Ill.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence R. I.
Canton Stoker Corp., Canton, O.
Chain Belt Co., Milwaukee, Wis.
Chicago Fire Brick Co., Chicago, Ill.
Cleveland Tramrail Div., Cleveland Crane & Eng. Co., Wickliffe, O.
CraneVevor Corp., Los Angeles, Calif.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Farquhar Co., A. B., York, Pa.
Hager Bros., Rockford, Ill.
Jeffrey Mfg. Co., Columbus, O.
Johnston & Jennings Co., Cleveland, O.
Joy Mfg. Co., Pittsburgh, Pa.
Link-Belt Co., Chicago, Ill.
Sprout, Waldron & Co., Muncy, Pa.
Spurgeon Co., Van Dyke, Mich.
Standard Transmission Equipment Co., Pasadena, Calif.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Whitty Co., Inc., Boston, Mass.

COOLERS, CRANE CAB

Dravo Corp., Pittsburgh, Pa.
Lintern Corp., Painesville, O.
Refrigeration Economics Co., Inc., Canton, O.
Trane Co., The, LaCrosse, Wis.

COOLERS, EVAPORATIVE

See Units, Air Conditioning, Summer, Evaporative Cooling Type

COOLERS, OIL

Acme Industries, Inc., Jackson, Mich.
American Cooling Tower Co., Kansas City, Mo.
American District Steam Co., Inc., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Andale Co., Philadelphia, Pa.
Armstrong Co., Richard M., Westchester, Pa.
Baltimore Aircoil Co., Inc., Baltimore, Md.
Bell & Gossett Co., Morton Grove, Ill.
Brown Fintube Co., The, Elyria, O.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Fluor Corp., Ltd., The, Los Angeles, Calif.
G & O Mfg. Co., New Haven, Conn.
Gilbert Brass Foundry Co., St. Louis, Mo.
Graham Mfg. Co., Inc., New York, N. Y.
Griscom-Russell Co., The, New York, N. Y.
Halstead & Mitchell, Pittsburgh, Pa.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Kewanee-Ross Corp., Kewanee, Ill.
Kold-Hold Mfg. Co., Lansing, Mich.
Manning & Lewis Engnieering Co., Newark, N. J.
Marlo Coil Co., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Perfex Corp., Milwaukee, Wis.
Refrigeration Economics Co., Inc., Canton, O.
Reliable Products Mfg. Co., Brooklyn, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sims Co., Erie, Pa.
Struthers Wells Corp., Titusville, Pa.
Superior Combustion Industries, Inc., New York, N. Y.
Super Radiator Corp., Minneapolis, Minn.
Taco Heaters, Inc., Providence, R. I.
Temprite Products Corp., Birmingham, Mich.
Trane Co., The, LaCrosse, Wis.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
Whitlock Mfg. Co., Hartford, Conn.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., New York, N. Y.

COOLERS, UNIT (FLOOR TYPE)

Not air conditioning units, but floor mounted unit with coil and centrifugal fans without filters, for connection to remote compressor or cold water supply. For air conditioning units see Units, Air Conditioning

Acme Industries, Inc., Jackson, Mich.
American Blower Corp., Detroit, Mich.
Baker Refrigeration Corp., South Windham, Me.
Baltimore Aircoil Co., Inc., Baltimore, Md.
Buffalo Forge Co., Buffalo, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Conditionaire Unit Co., Chicago, Ill.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer-Hanson, Inc., Los Angeles, Calif.
Economy Equipment Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Niagara Blower Co., New York, N. Y.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Super-Cold Corp., Los Angeles, Calif.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

COOLERS, UNIT (SUSPENDED TYPE)

Not air conditioning units, but suspended unit with coil and propeller fan, without filters, for connection to remote compressor or cold water supply. For air conditioning units, see Units, Air Conditioning

American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
American Cooling Tower Co., Kansas City, Mo.
Auburn Burner Co., Auburn, Ind.
Baker Refrigeration Corp., South Windham, Me.
Betz Corp., Hammond, Ind.
Buffalo Forge Co., Buffalo, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y.
Conditionaire Unit Co., Chicago, Ill.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer-Hanson, Inc., Los Angeles, Calif.
Economy Equipment Co., Chicago, Ill.
Fedders-Quigan Corp., Buffalo, N. Y.
Frigidaire Div., General Motors Corp., Dayton, O.
Governair Corp., Oklahoma City, Okla.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Super-Cold Corp., Los Angeles, Calif.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Engineering Corp., Chicago, Ill.
Wing Mfg. Co., L. J., Linden, N. J.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

COOLING COILS

See Surface, Cooling

COOLING SURFACE

See Surface, Cooling

COOLING TOWERS

See Towers, Cooling

COOLING UNITS

See Units, Air Conditioning; Coolers, Unit

COPPER PIPE

See Pipe, Brass and Copper

COPPER SHEETS

See Sheets, Copper

COPPER TUBE FITTINGS

See Fittings, Copper Tube

COPPER TUBE FITTINGS, FLARED

See Fittings, Copper Tube, Flared

COPPER TUBING

See Tubing, Brass and Copper

CORROSION PREVENTIVES

See Devices, Electrolytic, for Preventing Corrosion; Treatment, Steam System, to Inhibit Corrosion; and Treatment, Water, to Inhibit Corrosion

COUNTERS, DUST

Bausch & Lomb Optical Co., Rochester, N. Y.
Hill, E. Vernon & Co., Chicago, Ill.
Mine Safety Appliances Co., Pittsburgh, Pa.
Service to Industry, West Hartford, Conn.
Willson Products, Inc., Reading, Pa.

COUPLINGS, FLEXIBLE, POWER TRANSMISSION

Ajax Flexible Coupling Co., Westfield, N. Y.
American Flexible Coupling Co., Erie, Pa.
Blood Brothers Machine Co., Allegan, Mich. (Universal joints)
Boston Gear Wks., Inc., North Quincy, Mass.
Brooks Equipment Corp., Hoboken, N. J.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill.
Certified Flexible Couplings, New York, N. Y.
Chain Belt Co., Milwaukee, Wis.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Climax Metal Products Co., Cleveland, O.
Congress Drives Div., Tann Corp., Detroit, Mich.
Crocker-Wheeler Div., Elliott Co., Ampere, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Diamond Chain Co., Inc., Indianapolis, Ind.
Dodge Mfg. Corp., Mishawaka, Ind.
Falk Corp., Milwaukee, Wis.
Guardian Products Corp., Michigan City, Ind.
Jeffrey Mfg. Co., Columbus, O.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Koppers Co., Inc., Pittsburgh, Pa.
Link-Belt Co., Indianapolis, Ind.
Lord Mfg. Co., Erie, Pa.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Medart Co., St. Louis, Mo.
Mercury Clutch Div., Automatic Steel Products, Inc., Canton, O. (automatic centrifugal clutch)
Morse Chain Co., Detroit, Mich.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Piezo Mfg. Corp., New York, N. Y.
Poole Foundry & Machine Co., Baltimore, Md.
Ramsey Chain Co., Inc., Albany, N. Y.
Royersford Foundry & Machine Co., Inc., Royersford, Pa.
Shallcross Co., Philadelphia, Pa.
Sier Bath Gear & Pump Co., Inc., North Bergen, N. J.
Smith & Serrell, Inc., Newark, N. J.
Sprout, Waldron & Co., Muncy, Pa.
Waldron Corp., John, New Brunswick, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whitney Chain Co., Hartford, Conn.
Wood's Sons Co., T. B., Chambersburg, Pa.
Zurn Mfg. Co., J. A., Erie, Pa.

COUPLINGS, PIPE

Aero-Coupling Corp., Burbank, Calif.
Aeroquip Corp., Jackson, Mich.
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)

Camco Products Inc., North Haven, Conn.
Capitol Mfg. & Supply Co., Columbus, O.
Champion Machine & Forging Co., Cleveland, O.
Chase Brass & Copper Co., Waterbury, Conn.
Clow & Sons, James B., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Cooper-Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Drinkwater, Inc., Waukegan, Ill.
Fischer & Porter Co., Hatboro, Pa. (glass)
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Frick Co., Waynesboro, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
King Union Co., Inc., Hillsgrove, R. I.
Ladish Co., Cudahy, Wis.
Malleable Iron Fittings Co., Branford, Conn.
Marman Products Co., Inc., Los Angeles, Calif.
Morris Coupling & Clamp Co., Ellwood City, Pa.
Mueller Brass Co., Port Huron, Mich.
National Tube Div., United States Steel Co., Pittsburgh, Pa.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Rhode Island Fittings Co., Providence, R. I.
Semler Co., Jeannette, Pa.
Snap-Tite, Inc., Union City, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Stokes Molded Products, Inc., Trenton, N. J. (Hard rubber)
Tube Turns, Inc., Louisville, Ky. (welding couplings)
Union Metal Works, Chelsea, Mass.
United States Stoneware Co., New York, N. Y.
Victaulic Co. of America, Elizabeth, N. J.
Vogt Machine Co., Henry, Louisville, Ky.
Wachs Co., E. H., The, Chicago, Ill.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.
Weatherhead Co., The, Cleveland, O.
Wheatland Steel Products Co., Philadelphia, Pa.
Wheeling Machine Products Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

COUPLINGS, PIPE, DETACHABLE

Aero-Coupling Corp., Burbank, Calif.
Aeroquip Corp., Jackson, Mich.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Drinkwater, Inc., Waukegan, Ill.
Gates Engineering Co., Wilmington, Del.
Quik Joint Mfg. Co., Harvey, Ill.
Morris Coupling & Clamp Co., Ellwood City, Pa.
Roylyn, Inc., Glendale, Calif.
Smith, J. V., Oak Park, Ill.
Snap-Tite, Inc., Union City, Pa.
Victaulic Co. of America, Elizabeth, N. J.
Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.

CRANE CAB COOLERS

See Coolers, Crane Cab

CUT-OFFS, LOW WATER, HEATING BOILER

B/W Controller Corp., Birmingham, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
General Controls Co., Glendale, Calif.
Johnson Corp., The, Three Rivers, Mich.
Magnetrol, Inc., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Newark Controls Co., Bloomfield, N. J.
Penn Controls, Inc., Goshen, Ind.
Schaub Engineering Co., Fred H., Chicago, Ill.
Watts Regulator Co., Lawrence, Mass.
Webster & Co., Warren, Camden, N. J.

CUTTERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Atkins Saw Div., Borg-Warner Corp., Indianapolis, Ind.
Barnes Tool Co., The, New Haven, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Continental Machine Co., Chicago, Ill.
Crown Die & Tool Co., Chicago, Ill.
Erie Tool Works, Erie, Pa.
Gaines-Collins, Quijada Tool Division, Los Angeles, Calif.
Hollands Mfg. Co., Erie, Pa.
Landis Machine Co., Inc., Waynesboro, Pa.
M-M-A, Inc., Lancaster, Pa.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Saunders Mfg. Co., Yonkers, N. Y.
Toledo Pipe Threading Machine Co., Toledo, O.
Tri-Clover Machine Co., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Wachs Co., E. H., The, Chicago, Ill. (pipe saw)

CUTTERS, TUBING

Armstrong Bros. Tool Co., Chicago, Ill.
Bonney Forge & Tool Works, Allentown, Pa.
Capewell Mfg. Co., Hartford, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Machine Co., Chicago, Ill.
Couplings Co., Chicago, Ill.
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Gaines-Collins, Quijada Tool Division, Los Angeles, Calif.
Imperial Brass Mfg. Co., Chicago, Ill.
Landis Machine Co., Inc., Waynesboro, Pa.
Mueller Brass Co., Port Huron, Mich.
Nye Tool Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Tri-Clover Machine Co., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Weatherhead Co., Cleveland, O.

DAMPER OPERATORS

See Operators, Damper

DAMPER REGULATORS

See Regulators, Damper Sets

DAMPERS, DUCT, MANUALLY OPERATED

Acme Mfg. Co., Holmesburg, Philadelphia, Pa.
Adams Co., The, Dubuque, Ia.
Adelta Mfg. Co., Inc., Philadelphia, Pa.
Air Control Products, Inc., Coopersville, Mich.
Air & Refrigeration Corp., New York, N. Y.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
Ammerman Co., C. L., Minneapolis, Minn.
Anemostat Corp. of America, New York, N. Y.
Barnes Co, A. D., Dayton, O.
Controlair Mfg. Co., Los Angeles, Calif.
Corbman Bros., Inc., Philadelphia, Pa.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Excelsior Steel Furnace Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Inland Steel Products Co., Milwaukee, Wis.
Jacobs Co., B. & J., Cincinnati, O.
Kerentoff, G. L., Cincinnati, O.
Martens & Stormoen, Boston, Mass.
Minneapolis Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Salina Metal Products Co., Salina, Kan.
Sioux Steel Co., Sioux Falls, S. D.
Titus Mfg. Corp., Waterloo, Ia.
Thermix Corp., The, Greenwich, Conn.
Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Young Regulator Co., Cleveland, O.

DAMPERS, DUCT, REMOTE CONTROLLED

Air & Refrigeration Corp., New York, N. Y.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
Autempco Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Buensod-Stacey, Inc., New York, N. Y.
Combustion Equipment Co., Rock Island, Ill.
Conoflow Corp., Philadelphia, Pa.
Controlair Mfg. Co., Los Angeles, Calif.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.
Thermix Corp., The, Greenwich, Conn.
Tuttle & Bailey, Inc., New Britain, Conn.
Vapor Heating Corp., Chicago, Ill.
Young Regulator Co., Cleveland, O.

DAMPERS, PULSATION, FOR PIPING SYSTEMS

Campbell Co., J. A., Long Beach, Calif.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Industrial Acoustics Co., New York, N. Y.
Taylor Instrument Companies, Rochester, N. Y.

DEAERATORS

Acker Organization, Inc., W. M., Cleveland, O.
American Water Softener Co., Philadelphia, Pa.
Belco Industrial Equipment Div., Inc., Paterson, N. J.
Buflovac Equipment Div. of Blaw-Knox Co., Buffalo, N. Y.
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Elliott Co., Jeannette, Pa.
Fluor Corp., Ltd., The, Los Angeles, Calif.
General Filter Co., Ames, Ia.
General Heaters & Regulators Co., Chicago, Ill.
Graham Mfg. Co., Inc., New York, N. Y.
Graver Water Conditioning Co., New York, N. Y.
Hoppes Mfg. Co., Inc., Springfield, O.
Kewanee-Ross Corp., Kewanee, Ill.
Permutit Co., New York, N. Y.
Refinite Corp., Omaha, Neb.
Schaub Engineering Co., Fred H., Chicago, Ill.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
Swartwout Co., The, Cleveland, O.
Whitlock Mfg. Co., Hartford, Conn.
Worthington Corp., Harrison, N. J.

DEEP WELL PUMPS

See Pumps, Deep Well

DEHUMIDIFIERS, ABSORPTION AND ADSORPTION

Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Carbide and Carbon Chemicals Div., Union Carbide and Carbon Corp., New York, N. Y.
Cargocaire Engineering Corp., New York, N. Y.
Daly, Merritt & Sullivan, Inc., Falls Church, Va.
Dow Chemical Co., The, Midland, Mich.
Drying Systems, Inc., Chicago, Ill.
Floridin Co., Warren, Pa.
Kaufman Co., H. J., Detroit, Mich.
Kemp Mfg. Co., C. M., Baltimore, Md.
Niagara Industrial Corp., New York, N. Y.
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Selas Corp. of America, Philadelphia, Pa.
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.
Somers, Inc., H. J., Detroit, Mich.
Surface Combustion Corp., Toledo, O.
Tamms Industries, Inc., Chicago, Ill.

DEHUMIDIFIERS FOR COMPRESSED AIR

Glenwood-Inglewood Co., Minneapolis, Minn.
Kemp Mfg. Co., C. M. Baltimore, Md.
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.

DEHUMIDIFIERS, ELECTRIC PLUG-IN, FOR SMALL SPACES

Abbeon Supply Co., Jamaica, N. Y.
Bern's Mfg. Corp., Chicago, Ill.
Blissfield Mfg. Co., Blissfield, Mich.
Cargocaire Engineering Corp., New York, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Ebco Mfg. Co., Columbus, O.
Fedders-Quigan Corp., Buffalo, N. Y.
Fresh'nd-Aire Company, Div. of Cory Corp., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
Haertel Co., Walter, Minneapolis, Minn.
Hotpoint Co., Chicago, Ill.
Kauffman Air Conditioning Co., St. Louis, Mo.
Kemp Mfg. Co., C. M., Baltimore, Md.
Longergan Mfg. Co., Albion, Mich.
Mitchell Mfg. Co., Chicago, Ill.
Radio Corp., of America, RCA Victor Div., Camden, N. J.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Robbins & Myers, Inc., Fan Div., Memphis, Tenn.
Sterling Air Conditioning Corp., Washington, D. C.
Taylor Co., Halsey W., Warren, O.
Walton Laboratories, Inc., Irvington, N. J.
Westinghouse Electric Corp., Electric Appliance Div., East Springfield, Mass.

DEHUMIDIFIERS, SPRAY

See Washers, Air

DEHUMIDIFIERS, SPRAYED COIL

Air & Refrigeration Corp., New York, N. Y.
Carrier Corp., Syracuse, N. Y.
Kennard Corp., St. Louis, Mo.
Marlo Coil Co., St. Louis, Mo.
York Corp., York, Pa.

DEHUMIDIFYING UNITS

See Units, Air Conditioning; Dehumidifiers.

DEHYDRANT AND ACID NEUTRALIZER, FOR REFRIGERATING SYSTEMS

Allin Mfg. Co., Chicago, Ill.
Highside Chemicals Co., Clifton, N. J.
McIntire Connector Co., Newark, N. J.
Mueller Brass Co., Port Huron, Mich.
Selas Corp. of America, Philadelphia, Pa.

DEHYDRATORS, REFRIGERANT

A-P Controls Corp., Milwaukee, Wis.
Aluminum Co. of America, Pittsburgh, Pa.
Aminco Refrigeration Products Co., Detroit, Mich.
Cee Kleer Products Co., Cincinnati, O.
Eagle Chemical Co., Inc., Joliet, Ill.
Floridin Co., Warren, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Inc., The, Russell R., Cincinnati, O.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Madden Brass Products Co., Chicago, Ill.
McIntire Connector Co., Newark, N. J.
Mueller Brass Co., Port Huron, Mich.
Remco, Inc., Zelienople, Pa.
Selas Corp. of America, Philadelphia, Pa.
Sporlan Valve Co., St. Louis, Mo.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Techniflex Corp., Port Jervis, N. Y.
Wabash Mfg. Co., Chicago, Ill.

DESTROYERS, SOOT, CHEMICAL

Allen Co., Robert G., Mechanicsville, N. Y.
Ampion Corp., Long Island City, N. Y.
Bird Archer Co., Philadelphia, Pa.
Black & White Chemical Co., New York, N. Y.
Coughlan Co., G. N., West Orange, N. J.
Diamond Chemical Products, New York, N. Y.
General Filters, Inc., Detroit, Mich.
Healy Ruff Co., St. Paul, Minn.
Hercules Chemical Co., Inc., New York, N. Y.
Kenite Laboratory, Inc., Madison, N. J.
MacDermid Chemical Co., Bristol, Conn.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
National Aluminate Corp., Chicago, Ill.
Nutmeg Chemical Co., New Haven, Conn.
O'Brien Industries, Caldwell, N. J.
Perolin Co., Inc., Chicago, Ill.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Tamms Industries, Inc., Chicago, Ill.
Vinco Co., Inc., The, New York, N. Y.
Warren Refining & Chemical Co., The, Cleveland, O.
Western Chemical Co., Kansas City, Mo.

DESUPERHEATERS, STEAM

Babcock & Wilcox Co., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Foster Wheeler Corp., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Springfield Boiler Co., Springfield, Ill.
Whitlock Mfg. Co., Hartford, Conn.

DETECTORS, LEAK, REFRIGERANT

Allin Mfg. Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Gates & Co., Inc., George W., Franklin Sq., L. I., N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Goss Gas, Inc., Pittsburgh, Pa.
Highside Chemicals Co., Clifton, N. J.
Justrite Mfg. Co., Chicago, Ill.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Turco Products, Inc., Los Angeles, Calif.
Turner Brass Wks., Sycamore, Ill.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Velocity Power Tool Co., Pittsburgh, Pa.

DETECTORS, LEAK, UNDERGROUND PIPING

Fisher Research Laboratory, Inc., Palo Alto, Calif.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Radioactive Products, Inc., Detroit, Mich.
Wilkinson Products Co., Pasadena, Calif.

DEVICES, ELECTROLYTIC, FOR PREVENTING CORROSION

Aqua Electric Scale Control, Inc., Cleveland, O.
Brown Electro Co., Oklahoma City, Okla.
Electro Rust-Proofing Corp., Belleville, N. J.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Magnode Products, Inc., Trenton, O.
Marlo Coil Co., St. Louis, Mo.
McRay Products Co., South Pasadena, Calif.
Rotometals, Inc., San Francisco, Calif.
Wallace & Tiernan Co., Inc., Newark, N. J.

DEW POINT INDICATORS

See Indicators, Dew Point

DIAPHRAGM VALVES

See Valves, Diaphragm

DIESEL ENGINES

See Engines, Diesel, for Fan, Pump and Compressor Drives

DIFFUSERS, AIR, CEILING

See also Grilles; Panels, Perforated, for Air Diffusion; Register

Aerotrol Engineering Co., Pittsburgh, Pa.
Air Control Products, Inc., Coopersville, Mich.
Air Devices, Inc., New York, N. Y.
Aladdin Heating Corp., Oakland, Calif.
Anemostat Corp. of America, New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Carnes Co., W. R., Verona, Wis.
Connor Engineering Corp., W. B., Danbury, Conn.
Demuth & Sons, Charles, Mineola, L. I., N. Y.
Hart & Cooley Mfg. Co., Holland, Mich.
Krueger Air Conditioning Co., Tucson, Ariz.
Lima Register Co., The, Lima, O.
Multi-Vent Div., Pyle-National Co., The, Chicago, Ill.
Titus Mfg. Corp., Waterloo, Ia.
Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Universal Diffuser Corp., New York, N. Y.

DIFFUSION, AIR

See Panels, Perforated, for Air Diffusion

DISTRIBUTORS, WATER, FOR CONDENSERS

Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Martocello & Co., Jos. A., Philadelphia, Pa.

DOOR CONTROLS

See Controls, Door, Electric Eye

DOORS AND PANELS, ACCESS

Adams Co., The, Dubuque, Ia.
Air & Refrigeration Corp., New York, N. Y.
American Foundry & Furnace Co., Bloomington, Ill.
American Sheet Metal Works, New Orleans, La.
Auer Register Co., Cleveland, O.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Camloc Fastener Corp., Paramus, N. J. (Fasteners for)
Clarage Fan Co., Kalamazoo, Mich.
Decatur Iron & Steel Co., Decatur, Ala.
Falstrom Co., Passaic, N. J.
Inland Steel Products Co., Milwaukee, Wis.
International Steel Co., Evansville, Ind.
Kane Mfg. Corp., Kane, Pa.
Kirk & Blum Mfg. Co., Cincinnati, O.
Knapp Bros. Mfg. Co. Inc., Cincinnati, O.
Lockjoint Wood Products Co., Wichita, Kan.
Lumm Co., A. H., Toledo, O.
Technical Ply-Woods, Chicago, Ill.
Walsh Co., L. M., The, Boston, Mass.
Western Wire & Iron Works, Inc., Chicago, Ill. (Metal)

DRAFT CONTROL

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAFT GAGES

See Gages, Indicating, Draft

DRAFT RECORDERS

See Recorders, Draft

DRAFT REGULATORS

See Controls, Draft, Barometric; Regulators, Draft, Combustion

DRAWING TEMPLATES, PIPING

See Templates, Drawing, Piping

DRIERS

See Dehydrators, Refrigerant

DRILLS, ELECTRIC AND PNEUMATIC, PORTABLE

Albertson & Co., Inc., Sioux City, Ia.
Black & Decker Mfg. Co., Towson, Md.
Buckeye Tools Corp., Dayton, O.
Chicago Pneumatic Tool Co., New York, N. Y.
Cincinnati Electrical Tool Co., The, Cincinnati, O.
Clark Electric Co., Jas., Jr., Louisville, Ky.
Fasco Industries, Inc., Rochester, N. Y.
Greyhound A. C. Arc Welder Corp., Brooklyn, N. Y.
Independent Pneumatic Tool Co., Aurora, Ill.
Ingersoll-Rand Co., New York, N. Y.
Joy Mfg. Co., Pittsburgh, Pa.
Keller Tool Co., Grand Haven, Mich.
Lee Co., K. O., Aberdeen, S. D.
Mall Tool Co., Chicago, Ill.
Millers Falls Co., Greenfield, Mass.
Porter-Cable Machine Co., Syracuse, N. Y.
Portable Electric Tools, Inc., Chicago, Ill.
R C S Tool Sales Corp., Joliet, Ill.
Skil Corp., Chicago, Ill.
Spartan Tool Co., Chicago, Ill.
Speedway Mfg. Co., Chicago (Cicero), Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Syntron Co., Homer City, Pa.
U. S. Electrical Tool Co., Cincinnati, O.
Wodack Electric Tool Corp., Chicago, Ill.

DRILLS, POWDER OPERATED

Ramset Fasteners, Inc., Cleveland, O.
Remington Arms Co., Inc., Bridgeport, Conn.
Tempo Products Co., Cleveland, O.
Velocity Power Tool Co., Pittsburgh, Pa. (drives studs for pipe hangers, etc. into concrete)

DRIVES, CHAIN

Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Chain Belt Co., Milwaukee, Wis.
CraneVeyor Corp., Los Angeles, Calif.
Diamond Chain Co., Inc., Indianapolis, Ind.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Horton Mfg. Co., Minneapolis, Minn.
Jeffrey Mfg. Co., Columbus, O.
Link-Belt Co., Indianapolis, Ind.
Medart Co., St. Louis, Mo.
Morse Chain Co., Detroit, Mich.
Ramsey Chain Co., Inc., Albany, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Whitney Chain Co., Hartford, Conn.

DRIVES, COOLING TOWER FAN

Doerr Electric Corp., Cedarburg, Wis.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.

DRIVES, FLAT BELT

See also Belting, Leather and Belting, Rubber

American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Caldwell Co., W. E., Louisville, Ky.
Chicago Belting Co., Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex.
Goodrich Co., B. F., Akron, O.
Horton Mfg. Co., Minneapolis, Minn.
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Rhoads & Sons, J. E., Philadelphia, Pa.
Williams & Son, I. B., Dover, N. H.
Wood's Sons Co., T. B., Chambersburg, Pa.

DRIVES, POWER FOR PIPE THREADING

Beaver Pipe Tools, Inc., Warren, O.
Ridge Tool Co., Elyria, O.
Toledo Pipe Threading Machine Co., Toledo, O.

DRIVES, V BELT

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Browning Mfg. Co., Inc., Maysville, Ky.
Chicago Belting Co., Chicago, Ill.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Congress Drives Div., Tann Corp., Detroit, Mich.
Dayton Rubber Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J.
Dodge Mfg. Corp., Mishawaka, Ind.
Durkee-Atwood Co., Minneapolis, Minn.
Gates Rubber Co., The, Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga.
Goodrich Co., B. F., Akron, O.
Horton Mfg. Co., Minneapolis, Minn.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Maurey Mfg. Corp., Chicago, Ill.
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Thermoid Co., Trenton, N. J.
V-Belt Clutch Co., Los Angeles, Calif.
Wayne Manufacturing Co., Pomona, Calif.
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Corp., Harrison, N. J.

DRIVES, VARIABLE SPEED

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

DRYERS FOR COMPRESSED AIR

See Dehumidifiers for Compressed Air

DRYERS, INDUSTRIAL (COMPARTMENT, TUNNEL CONVEYOR, VACUUM, SPRAY, ROTARY, ETC.)

Air & Refrigeration Corp., New York, N. Y.
Biggs Boiler Works Co., The, E. Akron, O.
Bowen Engineering, Inc., North Branch, N. J.
Buflovac Equipment Div. of Blaw-Knox Co., Buffalo, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Economy Equipment Co., Chicago, Ill.
Instant Drying Corp., New York, N. Y.
Jackson & Church Co., Saginaw, Mich. (Dryer for corn, grain, hops, and wood)
Kirk & Blum Mfg. Co., Cincinnati, O.
Link-Belt Co., Chicago, Ill.
Louisville Drying Machinery Unit, General American Transportation Corp., Louisville, Ky.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis, Minn.
Newcomb-Detroit Co., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Proctor & Schwartz, Inc., Philadelphia, Pa.
Raymond Pulverizer Div., Combustion Engineering-Superheater, Inc., Chicago, Ill.
Ross Engineering Corp., J. O., New York, N. Y.
Stokes Machine Co., F. J., Philadelphia, Pa.
Struthers Wells Corp., Titusville, Pa.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Western Precipitation Corp., Los Angeles, Calif.

DRYERS, REFRIGERANT

See Dehydrators, Refrigerant

DUAL THERMOSTATS

See Thermostats, Two Temperature or Dual

DUCT CONNECTIONS

See Connections, Duct, Flexible; Connectors for Non-Metallic Duct Fabrication

DUCT FURNACES

See Heaters, Duct

DUCT HEATERS

See Heaters, Duct

DUCT INSULATION

See Insulation, Duct

DUCT THERMOSTATS

See Thermostats, Duct Type

DUCT TURNING VANES

See Vanes, Duct Turning, Prefabricated

DUCTS AND DUCT FITTINGS, PREFABRICATED, METALLIC

Acer & Whedon, Inc., Medina, N. Y.
Acme Mfg. Co., Holmesburg, Philadelphia, Pa.
Adelta Mfg. Co., Inc., Philadelphia, Pa.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Buckeye Furnace Pipe Co., Columbus, O.
Champion Furnace Pipe Co., Peoria, Ill.
Char-Gale Mfg. Co., Minneapolis, Minn.
Chicago Furnace Supply Co., Chicago, Ill.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Corbman Bros., Inc., Philadelphia, Pa.
Flexonics Corp., Maywood, Ill.
General Corporation, Minneapolis, Minn.
Gray Metal Products, Inc., Rochester, N. Y.
Heil Process Equipment Corp., Cleveland, O. (lined)
Howes-Woods Co., Cambridge, Mass.
Inland Steel Products Co., Milwaukee, Wis.
International Heater Co., Utica, N. Y.
Jacobs Co., B. & J., Cincinnati, O.
Lennox Furnace Co., Marshalltown, Ia.
Littleford Bros., Inc., Cincinnati, O.
Metal Fabricators, Inc., Charlotte, N. C.
Meyer & Bro. Co., F., Peoria, Ill.
Moncrief Furnace Co., Atlanta, Ga.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Ohio Valley Hardware & Roofing Co., Evansville, Ind.
Schecter Brothers Co., Philadelphia, Pa.
Sioux Steel Co., Sioux Falls, S. D.
Smith-Raymond Co., Columbus, Ga.
United States Register Co., Battle Creek, Mich.
Van Noorden Co., E. Boston, Mass.
Viking Mfg. Corp., Cleveland, O.
Waverly Heating Supply Co., Boston, Mass.
Williamson Heater Co., Cincinnati, O.

DUCTS AND DUCT FITTINGS, PREFABRICATED, NON-METALLIC

American Ventilating Hose Co., New York, N. Y.
Arrowhead Rubber Co., Downey, Calif.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
du Pont de Nemours & Co., E. I., Fabrics & Finishes Dept., Wilmington, Del.
Excelsior Steel Furnace Co., The, Chicago, Ill.
Flexible Tubing Corp., Guilford, Conn.
Haveg Corp., Newark, Del. (for fumes)
Heil Process Equipment Corp., Cleveland, O.
Jacobs Co., B. & J., Cincinnati, O.
Johns-Manville, New York, N. Y.
Knight, Maurice A., Akron, O. (also Permanite)
Smith-Raymond Co., Columbus, Ga.
Sonoco Products Co., Hartsville, S. C.
United States Rubber Co., New York, N. Y.

DYE PENETRANT

See Penetrant, Dye

DUST COLLECTORS

See Collectors, Dust

DUST COUNTERS

See Counters, Dust

ECONOMIZERS, FUEL

Babcock & Wilcox Co., New York, N. Y.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Edge Moor Iron Works, Inc., Edge Moor, Del.
Foster Wheeler Corp., New York, N. Y.
Green Fuel Economizer Co., Beacon, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Springfield Boiler Co., Springfield, Ill.
Union Iron Works, Erie, Pa.

EJECTORS, SEWAGE

American-Marsh Pumps, Inc., Battle Creek, Mich.
Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., New York, N. Y.
Nash Engineering Co., South Norwalk, Conn.
Penberthy Injector Co., Detroit, Mich.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Weil Pump Co., Chicago, Ill.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Yeomans Bros. Co., Melrose Park, Ill.

ELBOWS, BALANCING, FOR HOT WATER HEATING SYSTEMS

Detroit Controls Corp., The, Detroit, Mich.
Hammond Brass Works, Hammond, Ind.
Kehm Corp., The, Chicago, Ill.
Reynolds Shaffer Co., Detroit, Mich.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.

ELECTRIC AIR CLEANERS

See Cleaners, Air, Electrical

ELECTRICAL RADIANT HEATING

See Conductors and Panels, Electrical, for Radiant Heating

ELECTRIC DRILLS

See Drills, Electric, Portable

ELECTRIC MOTORS

See Motors, Electric

ELECTRIC PIPE HEATING SYSTEMS

See Systems, Electric Pipe Heating

ELECTRIC SHEARS

See Shears, Electric, Portable

ELECTRIC UNIT HEATERS

See Heaters, Unit, Electric Heating Element

ELECTRIC WATER HEATERS

See Heaters, Water, Electric

ELECTRODES, ARC WELDING

Air Reduction Sales Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allegheny Ludlum Steel Corp., Pittsburgh, Pa. (Stainless)
Allied Weld-Craft, Inc., Indianapolis, Ind.
American Agile Corp., Cleveland, O.
American Brass Co., Waterbury, Conn.
American Steel & Wire Co., United States Steel Corp. Subsidiary, Cleveland, O.
Arcos Corp., Philadelphia, Pa.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Harnischfeger Corp., Milwaukee, Wis.
Hobart Bros. Co., Troy, O.
International Nickel Co., Inc., The, New York, N. Y.
Laclede Steel Co., St. Louis, Mo.
Lincoln Electric Co., Cleveland, O.
Marquette Mfg. Co., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
McKay Co., Pittsburgh, Pa.
Metal & Thermit Corp., New York, N. Y.
Mir-O-Col Alloy Co., Inc., Los Angeles, Calif. (for hard facing)
National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
Sight Feed Generator Co., West Alexandria, O.
Smith Corp., A. O., Milwaukee, Wis.
Trindl Products, Ltd., Chicago, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.

ELIMINATORS, AIR, FOR HEATING AND PIPING SYSTEMS

Anderson Co., V. D., The, Cleveland, O.
Armstrong Machine Works, Three Rivers, Mich.
Bell & Gossett Co., Morton Grove, Ill.
Dole Valve Co., The, Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Chicago, Ill.
Keeney Mfg. Co., Newington, Conn.
Livingstone Engineering Co., Worcester, Mass.
Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Moreheat Distribution, Inc., Cincinnati, O.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Multiplex Mfg. Co., Berwick, Pa.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Squires Co., C. E., The, Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Wright-Austin Co., Detroit, Mich.

ENAMELS AND LACQUERS

Acme White Lead & Color Works, Detroit, Mich.
Acorn Refining Co., Cleveland, O.
American-Marietta Co., Chicago, Ill.
Arco Co., The, Cleveland, O.
Atlas Powder Co., North Chicago, Ill.
Baer Bros., New York, N. Y.
Barreled Sunlight Paint Co., Providence, R. I.
Blue Ridge Talc Co., Inc., Henry, Va.
Claronex Products, Inc., Brooklyn, N. Y.
Cordo Chemical Co., Norwalk, Conn.
Debevoise Co., The, Brooklyn, N. Y.
Devoe & Raynolds Co., Inc., New York, N. Y.
Dixon Crucible Co., Joseph, Jersey City, N. J.
du Pont de Nemours & Co. (Inc.) E. I., Fabrics & Finishes Dept., Wilmington, Del.
Hague & Co., Alfred, Brooklyn, N. Y.
Heresite & Chemical Co., Manitowoc, Wis.
Hilo Varnish Corp., Div. of Carpenter-Morton Co., Everett, Mass.
Horn Co., Inc., A. C., Long Island City, N. Y.
Inter-Coastal Paint Corp., East St. Louis, Ill.
Interchemical Corp., Finishes Div., Newark, N. J.
Irvington Varnish and Insulator Co., Irvington, N. J.
Knight, Maurice A., Akron, O.
Koppers Co., Inc., Pittsburgh, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Mass & Waldstein Co., Newark, N. J.
Master Mechanics Co., Cleveland, O.
Midwest Products Co., Port Byron, Ill.
National Lead Co., New York, N. Y.
O'Brien Corp., The, South Bend, Ind.
Permatex Co., Inc., Brooklyn, N. Y.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Quigley Co., Inc., New York, N. Y.
Reilly Tar & Chemical Corp., Indianapolis, Ind.
Ronor Corp., Cleveland, O. (Spray units)
Rutland Fire Clay Co., Rutland, Vt.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Sherwin-Williams Co., The, Cleveland, O.
Sipe & Co., James B., Pittsburgh, Pa.
Sonneborn Sons, Inc., L., New York, N. Y.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Thompson & Co., Oakmont, Pa.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit, Mich.
United Chromium, Inc., New York, N. Y.
Warren Refining & Chemical Co., The, Cleveland, O.
Watson-Standard Co., Pittsburgh, Pa.
Wilbur & Williams Co., Brighton, Mass.
Wilhelm Co., A., Reading, Pa.

ENCLOSURES FOR PERIMETER AIR CONDITIONING SYSTEMS AND AIR CONDITIONING UNITS

Hinrichsen, Inc., A. F., New York, N. Y.
National Sheet Metal Works, New York, N. Y.

ENCLOSURES, RADIATOR

Hendrick Mfg. Co., Carbondale, Pa.
Kauffman Air Conditioning Corp., St. Louis, Mo.

ENGINES, DIESEL, FOR FAN, PUMP AND COMPRESSOR DRIVES

American Locomotive Co., Auburn, N. Y.
Anderson Diesel Engine Co., Philadelphia, Pa.
Baldwin-Lima-Hamilton Corp., Philadelphia, Pa.
Buda Co., Harvey, Ill.
Caterpillar Tractor Co., Peoria, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Continental Motors Corp., Muskegon, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Detroit Diesel Engine Div., General Motors Corp., Detroit, Mich.
Fairbanks, Morse & Co., Chicago, Ill.
Hill Diesel Engine Corp., Lansing, Mich.
Ingersoll-Rand Co., New York, N. Y.
Ready-Power Co., The, Detroit, Mich.
Synchro-Start Products, Inc., Skokie, Ill. (automatic controls to start, stop and protect internal combustion engines)
Waukesha Motors Co., Waukesha, Wis.
Witte Engine Works, Oil Well Supply Div., United States Steel Co., Kansas City, Mo.
Worthington Corp., Harrison, N. J.

ENGINES, GAS, FOR FAN, PUMP AND COMPRESSOR DRIVES

Buda Co., Harvey, Ill.
Chicago Pneumatic Tool Co., New York, N. Y.
Continental Motors Corp., Detroit, Mich.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Fairbanks Morse & Co., Chicago, Ill.
Ingersoll-Rand Co., New York, N. Y.
Ready-Power Co., The, Detroit, Mich.
Synchro-Start Products, Inc., Skokie, Ill. (automatic controls to start, stop and protect internal combustion engines)
Waukesha Motor Co., Waukesha, Wis.
Wayne Manufacturing Co., Pomona, Calif.
Witte Engine Works, Oil Well Supply Div., United States Steel Co., Kansas City, Mo.
Worthington Corp., Harrison, N. J.

ENGINES, STEAM, FOR FAN, PUMP AND COMPRESSOR DRIVES

Skinner Engine Co., Erie, Pa.
Troy Engine & Machine Co., Troy, Pa.
Vilter Mfg. Co., Milwaukee, Wis.
Wachs Co., E. H., The, Chicago, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.

EQUIPMENT, BALANCING

Bear Mfg. Co., Industrial Div., Rock Island, Ill.
Gisholt Machine Co., Madison, Wis.
Olsen Testing Machine Co., Tinius, Willow Grove, Pa.

EVAPORATIVE CONDENSERS

See Condensers, Refrigerating, Evaporative

EVAPORATIVE COOLERS

See Units, Air Conditioning, Summer, Evaporative Cooling Type

EVAPORATORS

See Chillers, Water

EXCHANGERS, HEAT

Adams Co., Inc., R. P., Buffalo, N. Y. (water to air)
Aerco Corp., Englewood, N. J.
Aerofin Corp., Syracuse, N. Y.
Alstrom Corp., Bronx, N. Y.
Aluminum Co., of America, Pittsburgh, Pa.
American District Steam Co., Inc., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Armstrong Co., Richard M., Westchester, Pa.
Baker Refrigeration Corp., Inc., South Windham, Me.
Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Wks., Co., The, E. Akron, O.
Binks Mfg. Co., Chicago, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bowen Engineering, Inc., North Branch, N. J.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co., West Hartford, Conn.
Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass.
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. Y.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Corning Glass Works, Corning, N. Y.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Dahlquist Mfg. Co., Inc., Div. of Process Engineering Inc., Somerville, Mass.
Davis Engineering Corp., Elizabeth, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Duriron Co., The, Dayton, O. (acid resisting)
Eastern Industries, Inc., New Haven, Conn.
Edwards Engineering Corp., Pompton Plains, N. J.
Fedders-Quigan Corp., Buffalo, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Foster Wheeler Corp., New York, N. Y.
Frick Co., Waynesboro, Pa.
General Ceramics & Steatite Corp., Keasbey, N. J. (Impervious Graphite)
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., Chicago, Ill.
Gilbert Brass Foundry Co., St. Louis, Mo.
Graham Mfg. Co., Inc., New York, N. Y.
Graver Water Conditioning Co., New York, N. Y.
Griscom-Russell Co., The, New York, N. Y.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Heil Process Equipment Corp., Cleveland, O.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Joy Mfg. Co., Pittsburgh, Pa.
Kaiser Co., E. B., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kellogg Co., M. W., The, New York, N. Y.
Kewanee-Ross Corp., Kewanee, Ill.
Kold-Hold Mfg. Co., Lansing, Mich.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Lindy Heaters, Inc., New York, N. Y.
Madden Corp., The, Chicago, Ill.
Manitowoc Shipbuilding, Inc., Manitowoc, Wis.
Manning & Lewis Engineering Co., Newark, N. J.
Marley Co., Inc., The, Kansas City, Kan.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Mueller Brass Co., Port Huron, Mich.
National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.
National Pipe Bending Co., New Haven, Conn.
National Radiator Co., The, Johnstown, Pa.
Niagara Blower Co., New York, N. Y.
Nooter Corp., St. Louis, Mo.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Perfex Corp., Milwaukee, Wis.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Reliable Products Mfg. Co., Brooklyn, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Rome-Turney Radiator Co., Rome, N. Y.
Schaub Engineering Co., Fred H., Chicago, Ill.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sims Co., Erie, Pa.
Smith Corp., A. O., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Struthers Wells Corp., Titusville, Pa.
Superior Combustion Industries, Inc., New York, N. Y.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Taco Heaters, Inc., Providence, R. I.
Techniflex Corp., Port Jervis, N. Y.
Therm-O-Wheel Inc., Div. of Crowell Associates, New York, N. Y. ("heat recovery wheel")
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Union Iron Works, Erie, Pa.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
United States Air Conditioning Corp., Minneapolis, Minn.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vapor Heating Corp., Chicago, Ill.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whitlock Mfg. Co., Hartford, Conn.
Wilson Engineering Corp., Chicago, Ill.
Worthington Corp., Harrison, N. J.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.
Yula Water Heaters, Inc., New York, N. Y.

EXCHANGERS, HEAT, REFRIGERANT SUCTION LINE

Acme Industries, Inc., Jackson, Mich.
Armstrong Co., Richard M., Westchester, Pa.
Betz Corp., Hammond, Ind.
Black Mfg. Co., The, Parkton, Md.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
Frick Co., Waynesboro, Pa.
Gerstein & Cooper Co., Inc., South Boston, Mass.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Kramer Trenton Co., Trenton, N. J.
Marlo Coil Co., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Refrigeration Economics Co., Inc., Canton, O.
Super-Cold Corp., Los Angeles, Calif.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Techniflex Corp., Port Jervis, N. Y.
Temprite Products Corp., Birmingham, Mich.
Trane Co., The, La Crosse, Wis.
Vilter Mfg. Co., The, Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.

EXHAUST HEADS

See Heads, Exhaust, for Pipe Lines

EXHAUSTERS, WELDING FUME

Aladdin Heating Corp., Oakland, Calif.
Allington & Curtis Mfg. Co., Saginaw, Mich.
American Blower Corp., Detroit, Mich.
American Machine Products Co., Marshalltown, Ia.
Ammerman Co., C. L., Minneapolis, Minn.
Bertram Co., Harvey P., The, Cincinnati, O.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Chicago Blower Corp., Franklin Park, Ill.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Coppus Engineering Corp., Worcester, Mass.
Dana Fan & Blower Corp., Cincinnati, O.
Day Co., The, Minneapolis, Minn.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Gallaher Co., The, Omaha, Neb. & Owatonna, Minn.
General Blower Co., Morton Grove, Ill.
Jenn Air Products Co., Indianapolis, Ind.
Kirk & Blum Mfg. Co., Cincinnati, O.
Mine Safety Appliances Co., Pittsburgh, Pa.
Peters-Dalton, Inc., Detroit, Mich.
Propellair Div., Robbins & Myers Inc., Springfield, O.

Ruemelin Mfg. Co., Milwaukee, Wis.
Torit Mfg. Co., St. Paul, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Whiting Corp., Harvey, Ill.
Wing Mfg. Co., L. J., Linden, N. J.
Wind-Way Fan & Ventilator Co., New Orleans, La.

EXPANDERS, TUBE

Airetool Mfg. Co., Springfield, O.
Chicago Pneumatic Tool Co., New York, N. Y.
Crane Packing Co., Chicago, Ill.
Key Co., East St. Louis, Ill.
Knuth Engineering Co., Chicago, Ill.
Wilson, Inc., Thomas C., Long Island City, N. Y.

EXPANSION BENDS

See Bends, Expansion

EXPANSION BOLTS

See Bolts, Expansion

EXPANSION JOINTS

See Joints, Pipe, Expansion

EXPANSION TANKS

See Tanks, Expansion, for Hot Water Heating Systems

EXPANSION VALVES

See Valves, Refrigeration

EXTRACTORS, PIPE

Chicago Specialty Mfg. Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Reps Tool Co., Inc., Hartford, Conn.
Ridge Tool Co., Elyria, O.
Roddick Tool Co., Anaheim, Calif.
Walton Co., Hartford, Conn.

FABRICATED PIPING

See Bends; Headers; etc.

FABRICATORS, PIPE

See Headers, Pipe, Welded; and Coils, Pipe

FAN BALANCING EQUIPMENT

See Equipment, Balancing

FAN BASES

See Bases and Pads, Vibration Isolating

FAN BLADES

See Blades, Propeller Fan

FAN HOUSINGS

See Housings, Fan, Centrifugal

FANS, AXIAL FLOW, PRESSURE TYPE

Aerovent Fan Co., Inc., Piqua, O. (Tubeaxial)
American Blower Corp., Detroit, Mich.
Bertram Co., Harvey P., The, Cincinnati, O.
Buffalo Forge Co., Buffalo, N. Y.
Chicago Blower Corp., Franklin Park, Ill. (tubeaxial)
Circulators & Devices Mfg. Corp., Brooklyn, N. Y. (vaneaxial)
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Hartzell Propeller Fan Co., Piqua, O.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering Inc., Dayton, O.
Joy Mfg. Co., Pittsburgh, Pa. (vaneaxial)
M & E Mfg. Co., Indianapolis, Ind.
Moore Co., The, Marceline, Mo. (vaneaxial)
Propellair Div., Robbins & Myers Inc., Springfield, O.
Sensenich Corp., Lancaster, Pa.
South Bend Air Products, Inc., South Bend, Ind.
Stanat Mfg. Co., Long Island City, N. Y. (vaneaxial -2, 4 & 6 in diameter)
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass
Wing Mfg. Co., L. J., Linden, N. J.

FANS, CENTRIFUGAL

Advance Aluminum Castings Corp., Chicago, Ill.
Advance Fan & Blower Co., Detroit, Mich
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O
Airwasher Corp., Eaton Rapids, Mich.
Aladdin Heating Corp., Oakland, Calif.
Allington & Curtis Mfg. Co., Saginaw, Mich.
American Blower Corp., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Machine Products Co., Marshalltown, Ia.
Ammerman Co., C. L., Minneapolis, Minn.
Bayley Blower Co., Milwaukee, Wis.
Bern's Mfg. Co., Chicago, Ill.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
Brundage Co., The, Kalamazoo, Mich.
Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., Des Moines, Ia.
Campbell Co., E. K., Kansas City, Mo.
Carolina Blower Co., Inc., Greensboro, N. C.
Century Fan & Ventilator Co., Stamford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Chicago Blower Corp., Franklin Park, Ill.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y
Clarage Fan Co., Kalamazoo, Mich.
Coppus Engineering Corp., Worcester, Mass.
Day Co., The, Minneapolis, Minn.
Dayton Electric Mfg. Co., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Eastern Air Devices, Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co, Rockford, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Ft. Worth Steel & Machinery Co., Ft. Worth, Tex
Garden City Fan Co., Chicago, Ill.
General Blower Co., Morton Grove, Ill.
General Heating Products Co., Philadelphia, Pa.
Green Fuel Economizer Co., Beacon, N. Y.
Hastings Air Conditioning Co., Hastings, Neb.
Ilg Electric Ventilating Co., Chicago, Ill.
Indiana Fan Company, Indianapolis, Ind.
International Sales Co., San Francisco, Calif.
Jackson & Church Co., Saginaw, Mich.
Jaden Mfg. Co., Hastings, Neb.
Jamieson Mfg. Co., Dallas, Tex.
Jeffrey Mfg. Co., Columbus, O.
Jenn Air Products Co., Indianapolis, Ind.
King Co., The, Owatonna, Minn.
Lau Blower Co., Dayton, O.
Lehigh Fan & Blower Co., Allentown, Pa.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., Minneapolis Minn.
Martin Fan & Blower Co., Chicago, Ill.
Montag Stove & Furnace Wks., Portland, Ore.
Morrison Products Inc., Cleveland, O.
Motionair Co., Los Angeles, Calif.
Mountain States Equipment Co., Denver, Colo.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Murray Co. of Texas, The, Dallas, Tex.
National Engineering & Mfg. Co., Kansas City, Mo.
Nelson, Herman, Products, American Air Filter Co., Inc., Louisville, Ky.
New York Blower Co., Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Niagara Blower Co., New York, N. Y.
Northern Blower Co., Cleveland, O.
Palmer Mfg. Co., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
Phelps Mfg. Co., Little Rock, Ark.
Prat-Daniel Corp., East Port Chester, Conn.
Reynolds Mfg. Co., The, Comstock Park, Mich.
Redmond Co., Inc., Owosso, Mich.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Schwitzer-Cummins Co., Indianapolis, Ind.
Standard Electric Mfg. Co., West Berlin, N. J.
Torrington Mfg. Co., The, Western Div., Van Nuys, Calif.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Trane Co., The, LaCrosse, Wis.
United Electric Service Co., Wichita Falls, Tex.
United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

FANS, PROPELLER

Acme Equipment Co., Muskogee, Okla.
Aeromatic Propeller Dept., Koppers Co., Inc., Baltimore, Md.
Aerovent Fan Co., Inc., Piqua, O.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O
Air Equipment Co., Chicago, Ill.
Aire-Foile Fan & Blower Co., Detroit, Mich.
Airmaster Corp., Chicago, Ill
Allen Ventilator Div., Production Planning Co., Rochester, Mich
American Blower Corp., Detroit, Mich
American Coolair Corp., Jacksonville, Fla.
Baldor Electric Co., St. Louis, Mo.
Bar-Brook Mfg. Co., Inc., Shreveport, La.
Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Bern's Mfg. Co., Chicago, Ill.
Bertram Co., Harvey P., The, Cincinnati, O.
Binks Mfg. Co., Chicago, Ill.
Bishop & Babcock Mfg. Co., Cleveland, O
Broan Mfg. Co., Inc., Milwaukee, Wis.
Bronson Fan Mfg. Co., Los Angeles, Calif.
Buffalo Forge Co., Buffalo, N. Y.
C & H Air Conditioning Fan Co., Inc., Atlanta, Ga.
Carling Turbine Blower Co., Worcester, Mass
Century Fan & Ventilator Co., Stamford, Conn

Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. Y.
Chicago Blower Corp., Franklin Park, Ill.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Climax Machinery Co., Indianapolis, Ind.
Commercialaire, Inc., Brooklyn, N. Y.
Cook Co., Loren, Berea, O.
Coppus Engineering Corp., Worcester, Mass.
Dana Fan & Blower Corp., Cincinnati, O.
Dayton Electric Mfg. Co., Chicago, Ill.
De Bothezat Fans Div., American Machine & Metals, Inc., New York, N. Y.
DeVilbiss Co., The, Toledo, O.
Diehl Mfg. Co., Somerville, N. J.
Dual-Air Fan Co., South Elgin, Ill.
Dynamic Air Engineering, Inc., Los Angeles, Calif.
Eastern Air Devices, Inc., Brooklyn, N. Y.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fasco Industries, Inc., Rochester, N. Y.
Gallaher Co., The, Omaha, Nebr.
Garden City Fan Co., Chicago, Ill.
General Blower Co., Morton Grove, Ill.
Guth Co., Edwin F., St. Louis, Mo.
Hartzell Propeller Fan Co., Piqua, O.
Holden Fan Co., Detroit, Mich.
Hunter Fan & Ventilating Co., Inc., Memphis, Tenn.
Ilg Electric Ventilating Co., Chicago, Ill.
Indiana Fan Co., Indianapolis, Ind.
International Engineering, Inc., Dayton, O.
Jamieson Mfg. Co., Dallas, Tex.
Jeffrey Mfg. Co., Columbus, O.
Jenn Air Products Co., Indianapolis, Ind.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Kernchen Co., Chicago, Ill.
King Co., The, Owatonna, Minn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
McLarty Systems, Battle Creek, Mich.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Moore Co., The, Marceline, Mo.
Motionair Co., Los Angeles, Calif.
Mountain States Equipment Co., Denver, Colo.
Muckle Mfg. Co., Owatonna, Minn.
Myers Electric Co., Inc., Pittsburgh, Pa.
National Engineering & Mfg. Co., Kansas City, Mo.
National Gas Equipment Co., Inc., Terrell, Tex.
Nelson, Herman, Products, American Air Filter Co., Inc., Louisville, Ky.
New York Blower Co., Chicago, Ill.
Peerless Electric Co., Warren, O. (Disc)
Perkins & Son, Inc., B. F., Holyoke, Mass.
Phelps Mfg. Co., Little Rock, Ark.
Pritchard & Co., J. F., Kansas City, Mo.
Propellair Div., Robbins & Myers, Inc., Springfield, O.
Reed Unit-Fans, Inc., New Orleans, La.
Reynolds Electric Co., River Grove, Ill.
Robbins & Myers, Inc., Fan Div., Memphis, Tenn.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Schwitzer-Cummins Co., Indianapolis, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
Sensenich Corp., Lancaster, Pa.
Signal Electric Mfg. Co., Menominee, Mich.
Somers, Inc., H. J., Detroit, Mich.
South Bend Air Products, Inc., South Bend, Ind.
Standard Electric Mfg. Co., West Berlin, N. J.
Sutton Corp., O. A., The, Wichita, Kan.
Swift Mfg. Co., Inc., Hazel Park, Mich.
Thermal Industries, Indio, Calif.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Trane Co., The, LaCrosse, Wis.
Truflow Fan Co., Harmony, Pa.
United Electric Service Co., Wichita Falls, Tex.
United States Air Conditioning Corp., Minneapolis, Minn.
Universal Industrial Propeller Co., Stamford, Conn.
Western Blower Co., Seattle, Wash.
Western Engineering & Mfg. Co., Venice, Calif.
Wind-Way Fan & Ventilating Co., New Orleans, La.
Wing Mfg. Co., L. J., Linden, N. J.

FASTENERS, INSULATION

Devices, Inc., New York, N. Y.
Gerrard & Co., A. J. Melrose Park, Ill.
Moore, Inc., Goodloe, E., Danville, Ill.
Miracle Adhesives Corp., New York, N. Y.
Nelson Stud Welding Div., Gregory Industries Inc., Lorain, O.
Ramset Fasteners, Inc., Cleveland, O.
Stic Klip Mfg. Co., Cambridge, Mass.
Tinnerman Products, Inc., Cleveland, O.

FEEDERS, CHEMICAL, PROPORTIONING

American Water Softener Co., Philadelphia, Pa.
Belco Industrial Equipment Div., Inc., Paterson, N. J.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bogue Electric Co., Paterson, N. J.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Cochrane Corp., Philadelphia, Pa.
Elgin Softener Corp., Elgin, Ill.
Fischer & Porter Co., Hatboro, Pa.
Fuller Co., Catasauqua, Pa.
Graver Water Conditioning Co., New York, N. Y.
Haering & Co., Inc., D. W., San Antonio, Tex.
Hungerford & Terry, Inc., Clayton, N. J.
Jeffrey Mfg. Co., Columbus, O.
Madden & Co., P. E., Chicago, Ill.
Milton Roy Co., Philadelphia, Pa.
National Aluminate Corp., Chicago, Ill.
Omega Machine Co., Div. of Builders Iron Foundry, Providence, R. I.
% Proportioneers, Inc. %, Providence, R. I.
Paddock Engineering Co., of Texas, Dallas, Tex.
Permutit Co., New York, N. Y.
Red Jacket Mfg. Co., Davenport, Ia.
Sprout, Waldron & Co., Muncy, Pa.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Syntron Co., Homer City, Pa.
Wallace & Tiernan Co., Inc., Newark, N. J.

FEEDERS, WATER, HEATING BOILER

Bailey Co., Chas. M., San Francisco, Calif.
Campbell Co., J. A., Long Beach, Calif.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
Kieley & Mueller, Inc., North Bergen, N. J.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Magnetrol, Inc., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nason Co., Clarkston, Mich.
Newark Controls Co., Bloomfield, N. J.
Penn Controls, Inc., Goshen, Ind.
Schaub Engineering Co., Fred H., Chicago, Ill.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Templeton Bros., Hyde Park, Mass.
Watts Regulator Co., Lawrence, Mass.
Webster & Co., Warren, Camden, N. J.

FEEDWATER HEATERS

See Deaerators

FIBER PACKING

See Packing, Fiber

FIBER PIPE

See Pipe, Fiber

FILTER GAGES

See Gages, Air Filter

FILTERS, AIR, AUTOMATIC

Air-Stream Filter Corp., St. Louis, Mo.
American Air Filter Co., Inc., Louisville, Ky.
Bahnson Co., Winston-Salem, N. C.
Continental Air Filters, Inc., Louisville, Ky.
Dollinger Corp., Rochester, N. Y.
Farr Co., Los Angeles, Calif.
Ruemelin Mfg. Co., Milwaukee, Wis.

FILTERS, AIR, ELECTRIC

See Cleaners, Air, Electrical

FILTERS, AIR, GREASE

Air Devices, Inc., New York, N. Y.
Air Filter Corp., Milwaukee, Wis.
Air-Maze Corp., Cleveland, O.
American Air Filter Co., Inc., Louisville, Ky.
Continental Air Filters, Inc., Louisville, Ky.
Dollinger Corp., Rochester, N. Y.
Farr Co., Los Angeles, Calif.
Filtair Mfg. Co., San Francisco, Calif.
Research Products Corp., Madison, Wis.
Smith Filter Corp., Moline, Ill.

FILTERS, AIR, UNIT, CLEANABLE

Air Devices, Inc., New York, N. Y.
Air Filter Corp., Milwaukee, Wis.
Air-Maze Corp., Cleveland, O.
Air-Stream Filter Corp., St. Louis, Mo.
American Air Filter Co., Inc., Louisville, Ky.
Annis Air Filter Div., Royal Heaters, Inc., Alhambra, Calif.
Bard Mfg. Co., Bryan, O.
Carey Electronic Engineering Co., Metal Wool Div., Springfield, O.
Continental Air Filters, Inc., Louisville, Ky.
Coppus Engineering Corp., Worcester, Mass.

Dollinger Corp., Rochester, N. Y.
Farr Co., Los Angeles, Calif.
Goodyear Tire & Rubber Co., Akron, O. (electrostatic)
Kauffman Air Conditioning Corp., St. Louis, Mo.
Research Products Corp., Madison, Wis.
Somers, Inc., H. J., Detroit, Mich.
Smith Filter Corp., Moline, Ill.
Supreme Air Filter Co., New York, N. Y.

FILTERS, AIR, UNIT, RENEWABLE MEDIA

Air-Maze Corp., Cleveland, O.
American Air Filter Co., Inc., Louisville, Ky.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Annis Air Filter Div., Royal Heaters, Inc., Alhambra, Calif.
Dollinger Corp., Rochester, N. Y.
Glasfloss, New York, N. Y.
Himelblau Associates, Inc., Chicago, Ill.
Research Products Corp., Madison, Wis.

FILTERS, AIR, UNIT, THROW-AWAY

American Air Filter Co., Inc., Louisville, Ky.
Beck Mfg. Co., New Albany, Ind. (Special sizes)
Cambridge Corp., Syracuse, N. Y.
Drico Industrial Corp., New York, N. Y.
Glasfloss, New York, N. Y.
Mine Safety Appliances Co., Pittsburgh, Pa.
Morf Industries, Inc., Staten Island, N. Y.
Owens-Corning Fiberglas Corp., Toledo, O.
Research Products Corp., Madison, Wis.
Wilson & Co., Inc., Chicago, Ill.

FILTERS FOR OIL BURNERS

Commercial Filters Corp., Melrose, Mass.
Cuno Engineering Corp., Meriden, Conn.
Eddington Metal Specialty Co., Eddington, Pa.
Fano-Flame Oil Burner Corp., Huntington Park, Calif.
General Filters, Inc., Detroit, Mich.
Marquart Mfg. Co., Oakland, Calif.
Meldon Industries Div., Tool Industries, Inc., Detroit, Mich.
Morse-Smith-Morse Co., The, Watertown, Mass.
Rega Mfg. Co., Rochester, N. Y.
Sparkler Mfg. Co., Mundelein, Ill.
W. G. B. Oil Clarifier, Inc., Kingston, N. Y.

FILTERS, ODOR

See Adsorbers, Odor

FILTERS, PIPE LINE

Adams Co., Inc., R. P., Buffalo, N. Y.
Air Conversion Research Corp., Chicago, Ill.
Air-Line Engineering Co., Mansfield, Ohio
Air-Maze Corp., Cleveland, Ohio.
Alco Valve Co., St. Louis, Mo.
American Air Filter Co., Inc., Louisville, Ky.
American Cyanamid & Chemical Corp., New York, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Andale Co., Philadelphia, Pa.
Anderson Co., V. D., The, Cleveland, O.
Bowser, Inc., Fort Wayne, Ind.
CCA Products, Inc., Glendale, Calif.
Champion Laboratories, Inc., Meriden, Conn.
Cleveland Humidifier Co., Cleveland, O.
Commercial Filters Corp., Melrose, Mass.
Conoflow Corp., Philadelphia, Pa.
Cuno Engineering Corp., Meriden, Conn.
DeVilbiss Co., The, Toledo, O.
Dollinger Corp., Rochester, N. Y.
Eddington Metal Specialty Co., Eddington, Pa.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Fisher Governor Co., Marshalltown, Ia.
Fram Corp., Providence, R. I.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Filters, Inc., Detroit, Mich.
Johnson Corp., The, Three Rivers, Mich.
Kaye & MacDonald, Inc., West Orange, N. J.
Kraissl Co., Inc., The, Hackensack, N. J.
Marvel Engineering Co., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
Micro Metallic Corp., Glen Cove, N. Y.
Moraine Products Div., General Motors Corp., Dayton, O. (Porous metal)
Newark Wire Cloth Co., Newark, N. J.
Norgren Co., C. A., Englewood, Colo.
Norwalk Valve Co., South Norwalk, Conn.
Patrol Valve Co., The, Cleveland, O.
Rega Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Selas Corp. of America, Philadelphia, Pa.
Sparkler Mfg. Co., Mundelein, Ill.
Standard Machine & Mfg. Co., St. Louis, Mo.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Trerice Co., Detroit, Mich.
Tri-Clover Machine Co., Kenosha, Wis.
Warner Lewis Co., Tulsa, Okla.
Winslow Engineering Co., Oakland, Calif.
Worthington Corp., Harrison, N. J.

FILTERS, REFRIGERANT

A-P Controls Corp., Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Commercial Filters Corp., Melrose, Mass.
Dollinger Corp., Rochester, N. Y.
Eddington Metal Specialty Co., Eddington, Pa.
General Filter Co., Ames, Ia.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
McIntire Connector Co., Newark, N. J.
Moraine Products Div., General Motors Corp., Dayton, O. (Porous metal)
Mueller Brass Co., Port Huron, Mich.
Newark Wire Cloth Co., Newark, N. J.
Phillips & Co., H. A., Chicago, Ill.
Remco, Inc., Zelienople, Pa.
Sporlan Valve Co., St. Louis, Mo.
Standard Machine & Mfg. Co., St. Louis, Mo.
Vilter Mfg. Co., The, Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.

FILTERS, WATER

Adams Co., Inc., R. P., Buffalo, N. Y.
Alco Valve Co., St. Louis, Mo.
American Cyanamid & Chemical Corp., New York, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Aqua-Mist Co., Topeka, Kan. (Aspenwood fibre)
Belco Industrial Equipment Div., Inc., Paterson, N. J.
Bowser, Inc., Fort Wayne, Ind.
Bruner Corp., Milwaukee, Wis.
Cochrane Corp., Philadelphia, Pa.
Commercial Filters Corp., Melrose, Mass.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cuno Engineering Corp., Meriden, Conn.
Dollinger Corp., Rochester, N. Y.
Duro Co., Dayton, O.
Eddington Metal Specialty Co., Eddington, Pa.
Elgin Softener Corp., Elgin, Ill.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Graver Water Conditioning Co., New York, N. Y.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Henry Valve Co., Melrose Park, Ill.
Homease Products Division, Paterson, N. J.
Hungerford & Terry, Inc., Clayton, N. J.
Kaye & MacDonald, Inc., West Orange, N. J.
Marvel Engineering Co., Chicago, Ill.
Micro Metallic Corp., Glen Cove, N. Y.
Newark Wire Cloth Co., Newark, N. J.
Norwood Associated Engineers Inc., Springfield, Mass.
% Proportioneers, Inc. %, Providence, R. I.
Permutit Co., New York, N. Y.
Red Jacket Mfg. Co., Davenport, Ia.
Refinite Corp., Omaha, Neb.
Research Products Corp., Madison, Wis.
Reynolds Shaffer Co., Detroit, Mich.
Stover Water Softener Co., St. Charles, Ill.
Uniflow Mfg. Co., Erie, Pa.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Winslow Engineering Co., Oakland, Calif.
Worthington Corp., Harrison, N. J.

FINNED TUBING

See Tubing, Finned

FIRE EXTINGUISHING SYSTEMS

See Systems, Fire Extinguishing

FIRE PUMPS

See Pumps, Fire

FITTINGS, BLOW PIPE

Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Allington & Curtis Mfg. Co., Saginaw, Mich.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Carolina Blower Co., Inc., Greensboro, N. C.
Chicago Metal Mfg. Co., Chicago, Ill.
Day Co., The, Minneapolis, Minn.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Griffin & Co., Louisville, Ky.
Indiana Fan Co., Indianapolis, Ind.
Kirk & Blum Mfg. Co., Cincinnati, O.
National Metal Fabricators, Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Northern Blower Co., Cleveland, O.
Peters-Dalton, Inc., Detroit, Mich.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Schmieg Industries, Detroit, Mich.
Tiffin Eaves Trough Clamp Co., Tiffin, O.
Torit Mfg. Co., St. Paul, Minn.
United States Register Co., Battle Creek, Mich.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
Young & Bertke Co., Cincinnati, O.

FITTINGS AND BUSHINGS, FUEL OIL TANK

Mel Gauge Co., East Haven, Conn.
Universal Valve Co., Elizabeth, N. J.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS FOR CENTRAL VACUUM CLEANING SYSTEMS

H P Products, Inc., Louisville, O.

FITTINGS, COPPER TUBE, COMPRESSION

Aircraft Fittings Co., Cleveland, O.
American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Couplings Co., Chicago, Ill.
Dole Valve Co., The, Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Everhot Products Co., Chicago, Ill.
Hays Mfg. Co., Erie, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Oil Equipment Mfg. Corp., New Haven, Conn.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Wabash Mfg. Co., Chicago, Ill.
Weatherhead Co., Cleveland, O.

FITTINGS, COPPER TUBE, FLARED

Acheson Mfg. Co., Rankin, Pa.
Aircraft Fitting Co., Cleveland, O.
American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Couplings Co., Chicago, Ill.
Dole Valve Co., The, Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Hays Mfg. Co., Erie, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Oil Equipment Mfg. Corp., New Haven, Conn.
Parker Appliance Co., The, Cleveland, O.
Phoenix Brass Fittings Corp., Irvington, N. J.
Remco, Inc., Zelienople, Pa.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Truetite Corp., The Bridgeport, Conn.
Weatherhead Co., Cleveland, O.

FITTINGS, COPPER TUBE, SOLDER

Acheson Mfg. Co., Rankin, Pa.
American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
General Fittings Co., Providence, R. I.
Grabler Mfg. Co., Cleveland, O.
Hammond Brass Works, Hammond, Ind.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Phoenix Brass Fittings Corp., Irvington, N. J.
Walworth Co., New York, N. Y. (Brazed)

FITTINGS, DRAINAGE, FIXED AIR BREAK

Crane Co., Chicago, Ill.
Semler Co., Jeannette, Pa.

FITTINGS, HOT WATER HEATING SYSTEMS, ONE PIPE

Autostributor Co., Lansing, Mich. (manifold for connecting radiator branches)
Bell & Gossett Co., Morton Grove, Ill.
General Heaters & Regulators Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Mel Products Co., The, New Haven, Conn.
Sall Bros. Co., Rockford, Ill.
Semler Co., Jeannette, Pa.
Sullivan Valve & Engineering Co., Butte, Mont.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.

FITTINGS, LIFT

Webster & Co., Warren, Camden, N. J.

FITTINGS, LINED

American Hard Rubber Co., New York, N. Y. (Rubber)
Bart Mfg. Corp., Belleville, N. J.
Cement Lined Pipe Co., Lynn, Mass. (Lead and tin)
Division Lead Co., Chicago, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Gates Engineering Co., Wilmington, Del.
Goodrich Co., B. F., Akron, O. (Rubber)
Heil Process Equipment Corp., Cleveland, O.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin)
Michigan Pipe Co., Bay City, Mich. (Wood, saran rubber)
National Lead Co., New York, N. Y. (Lead)
Northern Indiana Brass Co., Elkhart, Ind. (Tinned)
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (lead)
Saran Lined Pipe Co., Ferndale, Mich.
United States Rubber Co., New York, N. Y. (Rubber)
Warren Foundry & Pipe Corp., New York, N. Y. (cement)
Welstrom Inc., Hamilton, O. (welding)

FITTINGS, PIPE, ALUMINUM

Aircraft Fitting Co., Cleveland, O.
Aluminum Co. of America, Pittsburgh, Pa.
Ladish Co., Cudahy, Wis.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.

FITTINGS, PIPE, BRASS, THREADED

Acheson Mfg. Co., Rankin, Pa.
Aircraft Fitting Co., Cleveland, O.
American Manganese Bronze Co., Philadelphia, Pa.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Bowser, Inc., Fort Wayne, Ind.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Couplings Co., The, Chicago, Ill.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Ladish Co., Cudahy, Wis.
New York Brass Fdry., New York, N. Y.
Parker Appliance Co., Cleveland, O.
Penn Mfg. Corp., of Washington, Pa., Washington, Pa.
Phoenix Brass Fittings Corp., Irvington, N. J.
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Union Metal Wks., Chelsea, Mass.
Walworth Co., New York, N. Y.
Weatherhead Co., The, Cleveland, O.

FITTINGS, PIPE, BRASS, WELDING

Chase Brass & Copper Co., Waterbury, Conn.
Ladish Co., Cudahy, Wis.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Tube Turns, Inc., Louisville, Ky.
Walworth Co., New York., N. Y. (Brazed)

FITTINGS, PIPE, BRONZE, BRAZED

American Brass Co., Waterbury, Conn.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Union Metal Works, Chelsea, Mass.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, BRONZE, SOLDER

Acheson Mfg. Co., Rankin, Pa.
American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Crane Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
General Fittings Co., Providence, R. I.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Union Malleable Mfg. Co., Ashland, O.
Union Metal Works, Chelsea, Mass.

FITTINGS, PIPE, CAST IRON, FLANGED

Alabama Pipe Co., Anniston, Ala.
Altena Foundry & Machine Works, Inc., Lancaster, O.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.

Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kuhns Bros. Co., Dayton, O.
Malleable Iron Fittings Co., Branford, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
Parks-Cramer Co., Fitchburg Mass. (Jacketed)
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semler Co., Jeannette, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.
Vilter Mfg. Co., The, Milwaukee, Wis.
Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.
York Corp., York, Pa

FITTINGS, PIPE, CAST IRON, THREADED

Clow & Sons, James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Frick Co., Waynesboro, Pa.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kuhns Bros. Co., Dayton, O.
Malleable Iron Fittings Co., Branford, Conn.
Ravena Iron Co., Ravena, N. Y.
Semler Co., Jeannette, Pa.
Somerville Iron Works, Somerville, N. J.
Stockham Valves & Fittings, Birmingham, Ala.
U. S. Plug & Fitting Co., Wellington, O. (pipe plug)
Vilter Mfg. Co., The, Milwaukee, Wis.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
York Corp., York, Pa.

FITTINGS, PIPE, COMPRESSION

Aircraft Fitting Co., Cleveland, O.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa
Hays Mfg. Co., Erie, Pa.
Quik Joint Mfg. Co., Harvey, Ill.
Patrol Valve Co., The, Cleveland, O.

FITTINGS, PIPE, HARD RUBBER

American Hard Rubber Co., New York, N. Y.
Goodrich Co., B. F., Akron, O.
Luzerne Rubber Co., Trenton, N. J.
Stokes Molded Products, Inc., Trenton, N. J.
United States Rubber Co., New York, N. Y.

FITTINGS, PIPE, LEAD

Alpha Metals, Inc., Jersey City, N. J.
Division Lead Co., Chicago, Ill.
Eagle Picher Co., Cincinnati, O.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Heil Process Equipment Corp., Cleveland, O.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Resisto Pipe & Valve Co., East Cambridge, Mass
Rochester Lead Works, Inc., Rochester, N. Y.
Tube Turns, Inc., Louisville, Ky.

FITTINGS, PIPE, MALLEABLE

Corley Co., Inc., The, Jersey City, N. J.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki, Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Malleable Iron Fittings Co., Branford, Conn.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Rhode Island Fittings Co., Providence, R. I.
Stockham Valves & Fittings, Birmingham, Ala
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Union Malleable Mfg. Co., Ashland, O.
Vilter Mfg. Co., The, Milwaukee, Wis.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

FITTINGS, PIPE, MALLEABLE, BRAZED

Flagg & Co., Inc., Stanley G., Philadelphia, Pa.

FITTINGS, PIPE, NICKEL AND NICKEL ALLOY

American Manganese Bronze Co., Philadelphia, Pa.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Hasco Valve & Machine Co., Milwaukee, Wis.
International Nickel Co., Inc., The, New York, N. Y.
Ladish Co., Cudahy, Wis.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
Tube Turns, Inc., Louisville, Ky.
Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.
Welding Fittings Corp., New Castle, Pa.

FITTINGS, PIPE, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
American Agile Corp., Cleveland, O.
American Hard Rubber Co., New York, N. Y.
Aqua-Therm, Inc., Dayton, O.
Commercial Plastics Co., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
General Ceramics & Steatite Corp., Keasbey, N. J.
Haveg Corp., Newark, Del.
Mills Corp., Elmer E., Chicago, Ill.
North Penn Co., New York, N. Y.
Saran Lined Pipe Co., Ferndale, Mich.
United States Stoneware Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

FITTINGS, PIPE, SADDLE TEE

Skinner Co., M. B., South Bend, Ind.
Tube Turns, Inc., Louisville, Ky.

FITTINGS, PIPE, SANITARY

Duriron Co., Inc., The, Dayton, O. (corrosion resisting)
Stockham Valves & Fittings, Birmingham, Ala.
Tri-Clover Machine Co., Kenosha, Wis.

FITTINGS, PIPE, SPECIAL FOR BASEBOARD RADIATION

General Fittings Co., Providence, R. I., (special tee)

FITTINGS, PIPE, STAINLESS STEEL

Aircraft Fitting Co., Cleveland, O.
Alloy Stainless Products Co., Totowa, N. J.
Camco Products Inc., North Haven, Conn.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Frasse & Co., Peter A., New York, N. Y.
Globe Steel Tubes Co., Milwaukee, Wis.
Ladish Co., Cudahy, Wis.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Potts Co., Horace T., Philadelphia, Pa.
Pypon Co., Pittsburgh, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
Tube Turns, Inc., Louisville, Ky.
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Walworth Co., New York, N. Y.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.
Welding Fittings Corp., New Castle, Pa.

FITTINGS, PIPE, STAINLESS STEEL, WELDING

Cooper Alloy Foundry Co., The, Hillside, N. J.
Electric Steel Foundry Co., Portland, Ore.
Key Co., East St. Louis, Ill.
Ladish Co., Cudahy, Wis.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
Tube Turns, Inc., Louisville, Ky.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.
Welding Fittings Corp., New Castle, Pa.

FITTINGS, PIPE, STEEL, FLANGED

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Bonney Forge & Tool Works, Allentown, Pa.
Crane Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
Kerotest Mfg. Co., Pittsburgh, Pa.
Michigan Pipe Co., Bay City, Mich.
National Valve & Mfg. Co., Pittsburgh, Pa.
Navlor Pipe Co., Chicago, Ill.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.

Semet-Solvay Engrg Div., Allied Chemical & Dye Corp., New York, N. Y.
Tri-Clover Machine Co., Kenosha, Wis.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, STEEL, FORGED, THREADED

American Meter Co., Inc., New York, N. Y.
Bonney Forge & Tool Works, Allentown, Pa.
Capitol Mfg. & Supply Co., Columbus, O.
Crane Co., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Ladish Co., Cudahy, Wis.
Larkin Packer Co., St. Louis, Mo.
Tri-Clover Machine Co., Kenosha, Wis.
U. S. Plug & Fitting Co., Welilington, O. (pipe plugs)
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

FITTINGS, PIPE, STEEL, SOCKET WELD

Bonney Forge & Tool Works, Allentown, Pa.
Capitol Mfg. & Supply Co., Columbus, O.
Crane Co., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Ladish Co., Cudahy, Wis.
Tri-Clover Machine Co., Kenosha, Wis.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

FITTINGS, PIPE, STEEL, THREADED

Bonney Forge & Tool Works, Allentown, Pa.
Capitol Mfg. & Supply Co., Columbus, O.
Crane Co., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Henry Valve Co., Melrose Park, Ill.
Ladish Co., Cudahy, Wis.
Parker Appliance Co., The, Cleveland, O.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
R P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Tubing Seal Cap, Inc., San Gabriel, Calif. (plugs and caps)
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

FITTINGS, PIPE, STEEL, WELDING

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Bonney Forge & Tool Works, Allentown, Pa.
Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Ladish Co., Cudahy, Wis.
Larkin Packer Co., St. Louis, Mo.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis. (stainless steel)
Tube Turns, Inc., Louisville, Ky.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FITTINGS, PIPE, WROUGHT IRON, WELDING

Bonney Forge & Tool Works, Allentown, Pa.
Gustin Bacon Mfg. Co., Kansas City, Mo.
Ladish Co., Cudahy, Wis.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
Walworth Co., New York, N. Y.

FITTINGS, REFRIGERATION

Aero-Coupling Corp., Burbank, Calif.
Aeroquip Corp., Jackson, Mich.
Aminco Refrigeration Products Co., Detroit, Mich.
Baker Refrigeration Corp., South Windham, Me.
Chase Brass & Copper Co., Waterbury, Conn.
Commonwealth Brass Corp., Detroit, Mich.
Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Ladish Co., Cudahy, Wis.
Madden Brass Products Co., Chicago, Ill.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Remco, Inc., Zelienople, Pa.
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Superior Valve & Fittings Co., Pittsburgh, Pa.
U. S. Plug & Fitting Co., Wellington, O. (pipe plugs)
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Wabash Mfg. Co., Chicago, Ill.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.
Weatherhead Co., Cleveland, O.
Wittenmeier Machinery Co., Chicago, Ill.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Inc., Chicago, Ill.
York Corp., York, Pa.

FITTINGS, STEEL TUBE, FLARED

Aircraft Fitting Co., Cleveland, O.
Couplings Co., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Weatherhead Co., The, Cleveland, O.

FITTINGS, STEEL TUBE, FLARELESS

Imperial Brass Mfg. Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Weatherhead Co., The, Cleveland, Ohio

FLAME CONTROLS

See Controls, Flame Failure

FLANGE BOLTS

See Bolts and Studs, Flange

FLANGE SEPARATORS

See Separators, Flange

FLANGES, ORIFICE

American Meter Co., Inc., New York, N. Y.
Barton Instrument Corp., Los Angeles, Calif.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Conoflow Corp., Philadelphia, Pa.
Foxboro Co., Foxboro, Mass.
Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
Ladish Co., Cudahy, Wis.
Madden Corp., The, Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Trimount Instrument Co., Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, LAP JOINT

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Ladish Co., Cudahy, Wis.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, SCREWED

Camco Products Inc., North Haven, Conn.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Ladish Co., Cudahy, Wis.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
Walworth Co., New York, N. Y.

FLANGES, PIPE, ALLOY STEEL, WELDING

Camco Products Inc., North Haven, Conn.
Cooper Alloy Foundry Co., Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Hasco Valve & Machine Co., Milwaukee, Wis.
Key Co., East St. Louis, Ill.
Ladish Co., Cudahy, Wis.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
Walworth Co., New York, N. Y.
Welding Fitttings Corp., New Castle, Pa.

FLANGES, PIPE, ALUMINUM, WELDING

Ladish Co., Cudahy, Wis.
Tube Turns, Inc., Louisville, Ky.

FLANGES, PIPE, BRASS, SCREWED

Acheson Mfg. Co., Rankin, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Conoflow Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Providence, R. I.
Grinnell Co., Inc., Providence, R. I.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Ladish Co., Cudahy, Wis.
National Valve & Mfg. Co., Pittsburgh, Pa.
Northern Indiana Brass Co., Elkhart, Ind.
Quaker City Iron Wks., Philadelphia, Pa.
Ritter Pattern & Casting Co., New York, N. Y.
Union Metal Works, Chelsea, Mass.
Walworth Co., New York, N. Y.

FLANGES, PIPE, CAST IRON, SCREWED

Altens Foundry & Machine Works, Inc., Lancaster, O.
Clow & Sons, James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grinnell Co., Inc., Providence, R. I.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kuhns Bros. Co., Dayton, O.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Ravena Iron Co., Ravena, N. Y.
Ritter Pattern & Casting Co., New York, N. Y.
Semler Co., Jeannette, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Straight Line Foundry & Machine Corp., Direct Separator Div., Syracuse, N. Y.
U. S. Plug & Fitting Co., Wellington, O.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Warren Foundry & Pipe Corp., New York, N. Y.

FLANGES, PIPE, MALLEABLE IRON, SCREWED

Baker Refrigeration Corp., South Windham, Me.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Jefferson Union Co., New York, N. Y.
National Valve & Mfg. Co., Pittsburgh, Pa.
Walworth Co., New York, N. Y.

FLANGES, PIPE, NICKEL AND NICKEL ALLOY

Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Hasco Valve & Machine Co., Milwaukee, Wis.
International Nickel Co., Inc., The, New York, N. Y.
Ladish Co., Cudahy, Wis.
Pennsylvania Forge Co., Philadelphia, Pa.
Taylor Forge & Pipe Wks., Chicago, Ill.
Tri-Clover Machine Co., Kenosha, Wis.
Tube Turns, Inc., Louisville, Ky.
Walworth Co., New York, N. Y.
Welding Fittings Corp., New Castle, Pa.

FLANGES, PIPE, STEEL, LAP JOINT

Chicago Metal Mfg. Co., Chicago, Ill.
Crane Co., Chicago, Ill.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Ladish Co., Cudahy, Wis.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, SCREWED

Crane Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
G & H Mfg. Co., Philadelphia, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Mundelein, Ill.
Ladish Co., Cudahy, Wis.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
U. S. Plug & Fitting Co., Wellington, O.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FLANGES, PIPE, STEEL, WELDING

Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Atlantic Steel Co., Atlanta, Ga.
Bonney Forge & Tool Works, Allentown, Pa.
Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
Grinnell Co., Inc., Providence, R. I.
Harrisburg Steel Corp., Harrisburg, Pa.
Henry Valve Co., Melrose Park, Ill.
Hubbell Corp., Mundelein, Ill.
Key Co., East St. Louis, Ill.
Ladish Co., Cudahy, Wis.
Lumsden & Van Stone Co., Div. of Midwest Piping & Supply Co., South Boston, Mass.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Pennsylvania Forge Co., Philadelphia, Pa.
Phoenix Mfg. Co., Joliet, Ill.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Roessing Mfg. Co., Pittsburgh, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Taylor Forge & Pipe Works, Chicago, Ill.
Tube Turns, Inc., Louisville, Ky.
Vilter Mfg. Co., Milwaukee, Wis.
U. S. Plug & Fitting Co., Wellington, O.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

FLARED FITTINGS, COPPER TUBE

See Fittings, Copper, Tube, Flared

FLARED FITTINGS, STEEL TUBE

See Fittings, Steel Tube, Flared

FLARING TOOLS FOR TUBING

See Tools, Flaring

FLEXIBLE COUPLINGS

See Couplings, Flexible

FLEXIBLE DUCT CONNECTIONS

See Connections, Duct, Flexible

FLEXIBLE METAL HOSE

See Hose, Metal and Fittings

FLOAT SWITCHES

See Switches, Float

FLOAT VALVES

See Valves, Float

FLOATS, STEAM TRAP, ETC.

Armstrong Machine Wks., Three Rivers, Mich.
Bailey Co., Chas. M., San Francisco, Calif.
Chicago Float Works, Not Inc., Chicago, Ill.
Crane Co., Chicago, Ill.
Cryer Trap & Valve Co., Inc., New York, N. Y.
Harris & Co., Arthur, Chicago, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Kieley & Mueller, Inc., North Bergen, N. J.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Naugatuck Mfg. Co., Union City, Conn.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Owens & Co., Inc., Henry, Cranston, R. I.
Reichert Float & Mfg. Co., Toledo, O.
Reliance Gauge Column Co., Cleveland, O.
Sterling Engineering Mfg. Corp., Hyde Park, Mass.
Trane Co., The, La Crosse, Wis.
Watson & McDaniel Co., Philadelphia, Pa.
Williams Gauge Co., The, Pittsburgh, Pa.

FLOOR AND CEILING PLATES

See Plates, Floor and Ceiling

FLOW CONTROL VALVES

See Valves, Flow Control

FLOW METERS

See Meters, Flow

FLOW SWITCHES

See Switches, Flow

FORGED STEEL VALVES

See Valves, Forged Steel

FRESHENERS, AIR

See Adsorbers, Odor; Compounds, Air Freshening

FUEL ECONOMIZERS

See Economizers, Fuel

FUEL OIL UNITS

See Units, Fuel Oil

FURNACES, DUCT

See Heaters, Duct

FURNACES, WARM AIR, FOR INDUSTRIAL AND LARGE BUILDING CENTRAL HEATING

(Exclusively for duct distribution of air—300,000 Btu per hr and over) For direct fired heaters, which may be located in the space heated or may be used in central plant installations with duct distribution of the air, see the listings under Heaters, Air, Direct Fired.

Air Conditioning Engineering Co., Cambridge, Mass.
Aladdin Heating Corp., Oakland, Calif.
American Foundry & Furnace Co., Bloomington, Ill.
Arcweld Mfg. Co., Inc., Seattle, Wash.
Bard Mfg. Co., Bryan, O.
Beck Engineering Combustion Kompany, St. Louis, Mo.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O
Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Century Engineering Corp., Cedar Rapids, Ia.
Certified Furnace Co., Div. Stainless & Steel Products Co., St. Paul Minn.
Hayes Furnace Mfg. & Supply Co., Los Angeles, Calif.
International Sales Co., San Francisco, Calif.
Jackson & Church Co., Saginaw, Mich.
Lee Corporation, Wilmington, Del.
Lennox Furnace Co., Columbus, O.
MaGirl Foundry & Furnace Co., Bloomington, Ill.
McPherson Furnace & Supply Co., Portland, Ore.
Meyer Furnace Co., The, Peoria, Ill.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Heater Co., St. Paul, Minn.
Olson & Co., Arthur A., Canfield, O.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Quiet Automatic Oil Burner Corp., Newark, N. J.
Ray Oil Burner Co., San Francisco, Calif.
Rosebraugh Co., W. W., Salem, Ore.
Surface Combustion Corp., Toledo, O.
Syncromatic Corp., Watertown, Wis.
U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind
United States Radiator Corp., Detroit, Mich.

FUSIBLE LINKS

See Links, Fusible

GAGE GLASSES

See Glasses, Gage

GAGE TESTERS

See Testers, Gage, Dead Weight

GAGES, AIR FILTER

Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Hays Corp., Michigan City, Ind.
Herbusch Corp., The, St. Louis, Mo. (Warning device)
Hill, E. Vernon, Chicago, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Meriam Instrument Co., The, Cleveland, O.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, DRAFT

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Canton Stoker Corp., Canton, O.
Cleveland Fuel Equipment Co., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Hays Corp., Michigan City, Ind.
Hill, E. Vernon & Co., Chicago, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Perfex Corp., Milwaukee, Wis.
Precision Scientific Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

GAGES, INDICATING, PRESSURE

Acragage Corp., Milford, Conn.
Air Conversion Research Corp., Chicago, Ill.
Ashton Valve Co., Wrentham, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Canton Stoker Corp., Canton, O.
Cleveland Fuel Equipment Co., Cleveland, O.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dole Valve Co., The, Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Electro Products Laboratories, Inc., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
General Blower Co., Inc., Philadelphia, Pa.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Div., American Machine & Metals, Inc.,

New York, N. Y.
Hays Corp., Michigan City, Ind.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Keller Tool Co., Grand Haven, Mich.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Mettler Co., Inc., The, Los Angeles, Calif.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Modern Engineering Co., St. Louis, Mo.
New York Air Valve Corp., Brooklyn, N. Y.
Norwalk Valve Co., South Norwalk, Conn.
Perfex Corp., Milwaukee, Wis.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Thrush & Co., H. A., Peru, Ind.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine and Metals, Inc. Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.

GAGES, INDICATING, VACUUM

Acragage Corp., Milford, Conn.
Ashton Valve Co., Wrentham, Mass.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Crosby Steam Gage Valve Co., Wrentham, Mass.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dole Valve Co., The, Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hastings Instrument Co., Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport, Conn.
Hill, E. Vernon & Co., Chicago, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Marshalltown Mfg. Co., Marshalltown, Ia.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Norwalk Valve Co., South Norwalk, Conn.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Stokes Machine Co., F. J., Philadelphia, Pa.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine and Metals, Inc. Sellersville, Pa.
Wallace & Tiernan, Inc., Newark, N. J.
Weksler Thermometer Corp., New York, N. Y.

GAGES, LIQUID LEVEL

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Injector Co., Detroit, Mich.
Automatic Control Co., St. Paul, Minn.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Bearlee Products Co., Green Bay, Wis.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Caldwell Co., W. E., Louisville, Ky.
Crane Co., Chicago, Ill.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Defender Instrument and Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Works, Detroit, Mich.
Diamond Power Specialty Corp., Lancaster, O.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Frick Co., Waynesboro, Pa.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Hays Corp., Michigan City, Ind.
Henry Valve Co., Melrose Park, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
King Engineering Corp., Ann Arbor, Mich.
Krueger Sentry Gauge Co., Green Bay, Wis.
Liquidepth Indicators, Inc., Long Island City, N. Y.
Liquidometer Corp., Long Island City, N. Y.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Marshalltown Mfg. Co., Marshalltown, Ia.
Mel-Gauge Co., East Haven, Conn.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Morse-Smith-Morse, Inc., Watertown, Mass.
Nason Co., Clarkston, Mich.
New York Air Valve Corp., Brooklyn, N. Y.
Penberthy Injector Co., Detroit, Mich.
Petrometer Corp., Long Island City, N. Y.
Powell Co., Wm., Cincinnati, O.
Reliance Gauge Column Co., Cleveland, O.
Republic Flow Meters Co., Chicago, Ill.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Strahman Valves, Inc., New York, N. Y.
Swift Lubricator Co., Elmira, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine and Metals, Inc. Sellersville, Pa.
Wallace & Tiernan Co., Newark, N. J.
Williams Gauge Co., The, Pittsburgh, Pa. (Water)
Wright-Austin Co., Detroit, Mich.
Yarnall-Waring Co., Philadelphia, Pa.

GAGES, OIL TANK

Applied Mechanics Co., Boston, Mass.
Bearlee Products Co., Green Bay, Wis.
Boston Auto Gage Co., Pittsfield, Mass.
Boston Machine Works Co., Lynn, Mass.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Foxboro Co., Foxboro, Mass.
King Engineering Corp., Ann Arbor, Mich.
Krueger Sentry Gauge Co., Green Bay, Wis.
Liquidepth Indicators, Inc., Long Island City, N. Y.
Liquidometer Corp., Long Island City, N. Y.
Mel-Gauge Co., East Haven, Conn.
Penberthy Injector Co., Detroit, Mich.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Scully Signal Co., Cambridge, Mass.
Strahman Valves, Inc., New York, N. Y.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Viking Pump Co., Cedar Falls, Ia.

GAGES, PIPE

Three Point Industries, Chicago, Ill.

GALVANIZED SHEETS

See Sheets, Steel, Galvanized

GALVANNEALED SHEETS

See Sheets, Steel, Galvannealed

GAS BURNERS

See Burners, Gas

GAS ENGINES

See Engines, Gas

GAS FIRED RADIATORS

See Radiators, Gas Fired

GAS PRESSURE REGULATORS

See Regulators, Pressure, Gas

GAS VENT AND FLUE PIPE

See Pipe and Fittings, Gas Vent and Flue

GAS VOLUME METERS

See Meters, Volume, Air and Gas

GASKETS

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill. (Felt, rubber)
Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Akron Metallic Gasket Co., Akron, O.
Alpha Metals, Inc., Jersey City, N. J.
American Felt Co., Glenville, Conn.
Anchor Packing Co., Philadelphia, Pa. (Asbestos)
Armstrong Cork Co., Lancaster, Pa., (Cork & cork composition)
Baldwin Belting, Inc., New York, N. Y.
Belmont Packing & Rubber Co., Philadelphia, Pa.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y. (Lead)
Brady Co., W. H., Chippewa Falls, Wis.
Chase Brass & Copper Co., Waterbury, Conn. (Brass and copper)
Chesterton Co., A. W., Everett, Mass.
Chicago Gasket Co., Chicago, Ill.
Chicago-Wilcox Mfg. Co., Chicago, Ill.
Clow & Sons, James B., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Continental Rubber Wks., Erie, Pa.
Crane Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y. (Asbestos)
Durabla Mfg. Co., New York, N. Y. (Asbestos fibre)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Federated Metal Div., American Smelting & Refining Co., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill. (Heat and oil resisting)
Felters Company, The, Boston, Mass.
Flexitallic Gasket Co., Camden, N. J. (Metal, asbestos)
Flexlock Corp., Kent, O.
Garlock Packing Co., Palmyra, N. Y.
Gatke Corp., Chicago, Ill.
General Electric Co., Chemical Dept., Pittsfield, Mass.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Grant Wilson Inc., Chicago, Ill. (asbestos)
Graton & Knight Co., Worcester, Mass. (Leather)
Greene, Tweed & Co., North Wales, Pa.
Houghton & Co., E. F., Philadelphia, Pa. (Leather)
Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J. (Metal, metal asbestos)
Mortell Co., J. W., Kankakee, Ill.
National Engineering Products, Inc., Washington, D. C. (Plastic)
National Lead Co., New York, N. Y. (lead)
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Products Research Co., Los Angeles, Calif.
Quaker Rubber Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber and asbestos)
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Saran Lined Pipe Co., Ferndale, Mich.
Schieren Co., Chas. A., New York, N. Y.
Sponge Rubber Products Co., The, Shelton, Conn.
Spring Packing Corp., Chicago, Ill.
Steel Improvement & Forge Co., Cleveland, O.
Stokes Molded Products, Inc., Trenton, N. J. (Hard rubber)
Strahman Valves, Inc., New York, N. Y.
Technical Ply-Woods, Chicago, Ill.
Thermoid Co., Trenton, N. J.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Gasket Co., Camden, N. J.
United States Rubber Co., New York, N. Y. (Rubber, asbestos)
United States Stoneware Co., New York, N. Y.
Western Felt Wks., Chicago, Ill. (Felt)
Zimmerman Packing Co., Cincinnati, O. (also gasket cutters)

GASOLINE FIRED HEATERS

See Heaters, Gasoline Fired

GAS VENT AND FLUE PIPE AND FITTINGS

See Pipe and Fittings, Gas Vent and Flue

GATES, BLAST

Allington & Curtis Mfg. Co., Saginaw, Mich.
Bayley Blower Co., Milwaukee, Wis.
Berger Bros., Co., Philadelphia, Pa.
Buffalo Forge Co., Buffalo, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.
Clarage Fan Co., Kalamazoo, Mich.
Day Co., The, Minneapolis, Minn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Goethel Sheet Metal Works, Alfred, Milwaukee, Wis.
Indiana Fan Co., Indianapolis, Ind.
Kirk & Blum Mfg. Co., Cincinnati, O.
Maysteel Products, Inc., Milwaukee, Wis.
Newcomb-Detroit Co., Detroit, Mich.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Rockwell Co., W. S., Fairfield, Conn.
Spencer Turbine Co., Hartford, Conn.
Thermix Corp., The, Greenwich, Conn.
Western Blower Co., Seattle, Wash.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.

GENERATORS, STEAM, ELECTRIC

Bigelow Co., The, New Haven, Conn.
Custom Engrg. Co., Los Angeles, Calif.
Hill Diesel Engine Corp., Lansing, Mich.
Livingstone Engineering Co., Worcester, Mass.

GLASS, HEAT ABSORBING

See Windows, Heat Insulating

GLASS PIPE

See Pipe, Glass

GLASSES, GAGE

Bache, Semon & Co., New York, N. Y.
Chicago Specialty Mfg. Co., Chicago, Ill.
Corning Glass Works, Corning, N. Y.
Daigger & Co., A., Chicago, Ill.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Works, Detroit, Mich.
Diamond Power Specialty Corp., Lancaster, O.
Ernst Water Column & Gauge Co., Livingston, N. J.
Henry Valve Co., Melrose Park, Ill.
Libbey-Owens-Ford Glass Co., Toledo, O.
New York Air Valve Corp., Brooklyn, N. Y.
O P W Corp., Cincinnati, O.
Penberthy Injector Co., Detroit, Mich.
Reliance Gauge Column Co., Cleveland, O.
Scientific Instrument Co., Detroit, Mich.
Strahman Valves, Inc., New York, N. Y.
Superior Controls Co., Inc., Los Angeles, Calif.
Swift Lubricator Co., Elmira, N. Y.
Vilter Mfg. Co., The, Milwaukee, Wis.

GLASSES, SIGHT, FOR PIPE LINES

Allin Mfg. Co., Chicago, Ill.
American District Steam Co., Inc., North Tonawanda, N. Y.
Bowser, Inc., Fort Wayne, Ind.
Cee-Kleer Products Co., Cincinnati, O.
Cochrane Corp., Philadelphia, Pa.
Corning Glass Works, Corning, N. Y.
Fischer & Porter Co., Hatboro, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Libbey-Owens-Ford Glass Co., Toledo, O.
Mueller Brass Co., Port Huron, Mich.
O P W Corp., Cincinnati, O.
Penberthy Injector Co., Detroit, Mich.
Powell Co., Wm., The, Cincinnati, O.
Remco, Inc., Zelienople, Pa. (for refrigerant lines)
Sarco Co., Inc., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scientific Instrument Co., Detroit, Mich.
Superior Valve & Fittings Co., Pittsburgh, Pa.
Swift Lubricator Co., Elmira, N. Y.
Trinity Equipment Corp., Roselle Park, New Jersey
Webster & Co., Warren, Camden, N. J.

GLOBE VALVES

See Valves, Globe

GLYCOL VAPORIZERS

See Units, Sterilizing, Air

GOVERNORS, PUMP

Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Boylston Steam Specialty Co., Chicago, Ill.
Burrows Mfg. Co., F. A., York, Pa.
Cash Co., A. W., Decatur, Ill.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Hagan Corp., Pittsburgh, Pa.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Swartwout Co., The, Cleveland, O.
Texsteam Corp., Houston, Tex.
Warren Engineering Co., Broadway, N. J.

Watson & McDaniel Co., Philadelphia, Pa.
Webster & Co., Warren, Camden, N. J.
Williams Gauge Co., The, Pittsburgh, Pa.

GRILLES

See also Diffusers; Panels, Perforated, for Air Diffusion; Registers

A & A. Register Co., Cleveland, O.
A-J Mfg. Co., Kansas City, Mo.
Air Control Products, Inc., Coopersville, Mich.
Alton Mfg. Co., Dallas, Tex.
American Foundry & Furnace Co., Bloomington, Ill.
American Warming & Ventilating Co., Toledo, O.
Auer Register Co., Cleveland, O.
Bahnson Co., Winston-Salem, N. C.
Barber-Colman Co., Rockford, Ill.
Beckley Perforating Co., Garwood, N. J.
Best Register Co., Milwaukee, Wis.
Central Wire & Iron Works, Des Moines, Ia.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
Crown Iron Works, Minneapolis, Minn.
Decatur Iron & Steel Co., Decatur, Ala.
Diamond Mfg. Co., Wyoming, Pa.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Erdle Perforating Co., Rochester, N. Y.
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Hendrick Mfg. Co., Carbondale, Pa.
Independent Register Co., Cleveland, O.
Jamieson Mfg. Co., Dallas, Tex.
Johnston & Chapman Co., Chicago, Ill.
Lima Register Co., The, Lima, O.
Lockjoint Wood Products Co., Wichita, Kans. (Wood)
Louvra Corp., The, Union, N. J.
Manhattan Perforated Metal Co., Inc., Long Island City, N. Y.
Martin Metal Products Corp., Ferndale, Mich.
Midco Register Corp., St. Paul, Minn.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mundt & Sons, Charles, Jersey City, N. J.
Palmer Mfg. Corp., Phoenix, Ariz.
Pennant Corp., Grand Rapids, Mich.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Reliable Perforating Co., Chicago, Ill.
Rock Island Register Co., Rock Island, Ill.
Smith Co., J. B., Philadelphia, Pa.
Standard Stamping & Perforating Co., Chicago, Ill.
Stewart Mfg. Co., Inc., Cedar Grove, N. J.
Titus Mfg. Corp., Waterloo, Iowa.
Tuttle & Bailey, Inc., New Britain, Conn.
United States Air Conditioning Corp., Minneapolis, Minn.
United States Register Co., Battle Creek, Mich.
Utility Appliance Corp., Los Angeles, Calif.
Viking Mfg. Corp., Cleveland, O.
Western Wire & Iron Works, Inc., Chicago, Ill. (metal)
Wickwire Spencer Steel, Div. of Colorado Fuel & Iron Corp., New York, N. Y.
Young Regulator Co., Cleveland, O.

GRINDERS AND GRINDING WHEELS, WELD

Black & Decker Mfg. Co., The, Towson, Md.
Independent Pneumatic Tool Co., Aurora, Ill.
Mall Tool Co., Chicago, Ill.
Milwaukee Electric Tool Corp., Milwaukee, Wis.
Norton Co., Worcester, Mass.
Porter-Cable Machine Co., Syracuse, N. Y.
Skil Corp., Chicago, Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.

GUNS AND POTS, SMOKE AND SMUDGE, FOR TESTING AIR MOVEMENT

Hill, E. Vernon & Co., Chicago, Ill.
Kilgore Mfg. Co., Westerville, O.
Mine Safety Appliances Co., Pittsburgh, Pa.
Newman Co., Inc., I. C., New York, N. Y. (smoke containers)
Unexcelled Chemical Corp., New York, N. Y.

HAND SHEARS

See Shears and Snips, Hand

HANGERS OR BRACKETS, RADIATOR

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Arjac Products, Inc., Rochester, N. Y.
Carpenter & Paterson, Inc., East Boston, Mass.
Carty & Moore Engineering Co., Detroit, Mich.
Crawford Co., Chicago, Ill.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Gateway Engineering Co., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Hartmann Co., Chas., Brooklyn, N. Y.
Healy Ruff Co., St. Paul, Minn.
Jennison Co., Fitchburg, Mass. (Adjustable radiator foot rest)
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
National Radiator Co., The, Johnstown, Pa.
Unistrut Products Co., Chicago, Ill.
United States Radiator Corp., Detroit, Mich.

HANGERS AND SUPPORTS, DUCT

Excelsior Steel Furnace Co., The, Chicago, Ill.
Hexdall Co., A. M., Morris, Ill.
Moore Inc., Goodloe E., Danville, Ill.
Powder Power Tool Corp., Portland, Ore.
United Industries, Madison, Wis. (for use with precast concrete joists)
Unistrut Products Co., Chicago, Ill.
Velocity Power Tool Co., Pittsburgh, Pa. (cartridge stud driver)

HANGERS AND SUPPORTS, PIPE

American District Steam Co., Inc., North Tonawanda, N. Y.
Atlantic Steel Co., Atlanta, Ga.
Bergen Pipesupport Corp., New York, N. Y. (variable spring constant support)
Blaw Knox Construction Co., Power Piping and Sprinkler Div., Pittsburgh, Pa.
Carpenter & Paterson, Inc., East Boston, Mass.
Crane Co., Chicago, Ill.
Crawford Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Frick Co., Waynesboro, Pa.
G & H Mfg. Co., Philadelphia, Pa. (hook)
Gateway Engineering Co., Chicago, Ill.
General Fittings Co., Providence, R. I. (strap hangers)
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Korfund Co., Inc., Long Island City, N. Y.
Kynex Co., New York, N. Y. (for radiant heating)
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y. (spring hangers)
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Minerallac Electric Co., Chicago, Ill.
Moore Inc., Goodloe E., Danville, Ill.
National Valve & Mfg. Co., Pittsburgh, Pa.
Paine Co., Addison, Ill.
Piping Specialties, Inc., New York, N. Y. (anchor and guide for expansion joints)
Powder Power Tool Corp., Portland, Ore.
Ramset Fasteners, Inc., Cleveland, O. (conduit clips)
Ravena Iron Co., Ravena, N. Y. (hook plates)
Ric-wiL Co., Cleveland, O.
Ritter Pattern & Casting Co., New York, N. Y. (jack type adjustable tunnel stanchion)
Rockwood Sprinkler Co., Worcester, Mass.
Roessing Mfg. Co., Pittsburgh, Pa.
Russell Mfg. Co., John M., Naugatuck, Conn. (wire pipe hooks)
Stemen Mfg. Co., Wm., Newark, N. J.
Titchener, E. H. & Co., Binghamton, N. Y. (wire staples for copper & brass tubing)
Truscon Steel Co., Youngstown, O. (pressed steel inserts)
Unistrut Products Co., Chicago, Ill.
United Industries, Madison, Wis. (for use with precast concrete joists)
Velocity Power Tool Co., Pittsburgh, Pa. (cartridge stud driver)
Walworth Co., New York, N. Y.
Western Wire Products Co., St. Louis, Mo. (wire pipe hooks and perforated hanger iron)

HARD RUBBER PIPE AND FITTINGS

See Pipe, Hard Rubber; Fittings, Pipe, Hard Rubber

HEADERS, PIPE, WELDED

Acme Industries, Inc., Jackson, Mich.
Albert Pipe Supply Co., Brooklyn, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Atlantic Pipe Bending & Fabricating Corp., Edgewater, N. J.
Baker Refrigeration Corp., South Windham, Me.
Biggs Boiler Wks. Co., The, E. Akron, O.
Blaw Knox Construction Co., Power Piping and Sprinkler Div., Pittsburgh, Pa.
Buffalo Tank Corp., Newark, N. J.
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Cobra Pipe & Coil Co., Inc., Elmwood, Conn.
Columbian Steel Tank Co., Kansas City, Mo.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crane Co., Chicago, Ill.
Downingtown Iron Works, Downingtown, Pa.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
International Engineering Wks., Inc., Framingham, Mass.
Kellogg Co., M. W., The, New York, N. Y.
Lumsden & Van Stone Div. of Midwest Piping & Supply Co., South Boston, Mass.
Manning & Lewis Engineering Co., Newark, N. J.
Michigan Pipe Co., Bay City, Mich.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.

Mitchell & Co., Inc., W. K., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
National Valve & Mfg. Co., Pittsburgh, Pa.
Naylor Pipe Co., Chicago, Ill.
Ohio Pipe Bending & Mach. Co., Cleveland, O.
Philadelphia Pipe Bending Co., Philadelphia, Pa.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Pittsburgh Piping & Equipment Co., Pittsburgh, Pa.
Pressed Steel Co., Wilkes-Barre, Pa.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y.
Rempe Co., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Sales & Co., Murray W., Detroit, Mich.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Shaw Co., Benjamin F., Wilmington, Del.
Shaw Kendall Engineering Co., Toledo, O.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Western Piping & Engineering Co., San Francisco, Calif.
Whitlock Mfg. Co., Hartford, Conn.

HEADS, EXHAUST, FOR PIPE LINES

Anderson Co., V. D., The, Cleveland, O.
Centrifix Corp., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Dickinson, Aeolus, Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Hoppes Mfg. Co., Inc., Springfield, O.
Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Wright-Austin Co., Detroit, Mich.

HEADS, SPRINKLER, FOR FIRE PROTECTION

Grinnell Co., Inc., Providence, R. I.
Hodgman Mfg. Co., Taunton, Mass.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.

HEAT EXCHANGERS

See Chillers, Water; Condensers, Refrigerating; Exchangers, Heat; Surface, Cooling; Surface, Heating

HEAT PUMPS

See Units, Air Conditioning, Reverse Refrigeration Cycle

HEAT TRANSFER OIL

See Oil, Heat Transfer

HEATERS, AIR, DIRECT FIRED, COAL

Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Chelsea, Mass.
Lee Corporation, Wilmington, Del.
National Heater Co., St. Paul, Minn.
Olson & Co., Arthur A., Canfield, O.
Rosebraugh Co., W. W., Salem, Ore.

HEATERS, AIR, DIRECT FIRED, COMBINATION GAS AND OIL

Airtherm Mfg. Co., St. Louis, Mo.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Jackson & Church Co., Saginaw, Mich.
Olson & Co., Arthur A., Canfield, O.
Prat-Daniel Corp., South Norwalk, Conn.

HEATERS, AIR, DIRECT FIRED, GAS, CENTRIFUGAL FAN TYPE

For Furnaces for Central Plant Installation EXCLUSIVELY for Duct Distribution of the Air, See the Listing Under Furnaces

Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
American Furnace Co., St. Louis, Mo.
Auburn Burner Co., Auburn, Ind.
Automatic Gas Equipment Co., Pittsburgh, Pa.
Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Chicago Steel Furnace Co., Chicago, Ill.
Dravo Corp., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
General Gas Light Co., Kalamazoo, Mich.
Hastings Air Conditioning Co., Inc., Hastings, Neb.
International Sales Co., San Francisco, Calif.
Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Chelsea, Mass.
Kilbury Mfg. Co., Inc., Lawndale, Calif.
Lee Corporation, Wilmington, Del.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Nat Corp., Kansas City, Mo.
National Heater Co., St. Paul, Minn.
Newcomb-Detroit Co., Detroit, Mich.
Norge Heat Div., Borg-Warner Corp., Detroit, Mich.
Norman Products Co., Inc., Columbus, O.
Olson & Co., Arthur A., Canfield, O.
OverHead Heaters, Inc., Detroit, Mich.
Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Prat-Daniel Corp., East Port Chester, Conn.
Reznor Mfg. Co., Mercer, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Surface Combustion Corp., Toledo, O.
United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Zink Co., John, Tulsa, Okla.

HEATERS, AIR, DIRECT FIRED, OIL, FLOOR TYPE

Airtherm Mfg. Co., St. Louis, Mo.
American Foundry & Furnace Co., Bloomington, Ill.
Campbell Co., E. K., Kansas City, Mo.
Campbell Heating Co., Des Moines, Ia.
Chicago Steel Furnace Co., Chicago, Ill.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Jackson & Church Co., Saginaw, Mich.
Johnson Heater Corp., Chelsea, Mass.
Lee Corporation, Wilmington, Del.
National Heater Co., St. Paul, Minn.
Olson & Co., Arthur A., Canfield, O.
Prat-Daniel Corp., East Port Chester, Conn.
Ross Engineering Corp., J. O., New York, N. Y.

HEATERS, AIR, DIRECT FIRED, OIL, PORTABLE, FOR INDUSTRIAL SPACE HEATING

Auburn Burner Co., Auburn, Ind.
Chicago Steel Furnace Co., Chicago, Ill.
Fageol Heat Machine Co., Detroit, Mich.
National Heater Co., St. Paul, Minn.
Olson & Co., Arthur A., Canfield, O.
Prat-Daniel Corp., East Port Chester, Conn.
Quiet Automatic Oil Burner Corp., Newark, N. J.

HEATERS, AIR, DIRECT FIRED, OIL, SUSPENDED TYPE

Air Conditioning Engineering Co., Cambridge, Mass.
Airtherm Mfg. Co., St. Louis, Mo.
Auburn Burner Co., Auburn, Ind.
American Furnace Co., St. Louis, Mo.
Cox Mfg. Co., Ridgeville, Ind.
Campbell Co., E. K., Kansas City, Mo.
Chicago Steel Furnace Co., Chicago, Ill.
Dravo Corp., Machinery Div., Pittsburgh, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Fluid Heat Div., Anchor Post Products, Inc., Baltimore, Md.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Harvey-Whipple, Inc., Springfield, Mass.
Jackson & Church Co., Saginaw, Mich.
Lee Corp., Wilmington, Del.
Mueller Furnace Co., L. J., Milwaukee, Wis.
National Heater Co., St. Paul, Minn.
Olson & Co., Arthur A., Canfield, O.
OverHead Heaters, Inc., Detroit, Mich.
Petro, Cleveland, O.
Prat-Daniel Corp., East Port Chester, Conn.
Quiet Automatic Oil Burner Corp., Newark, N. J.
Waterman-Waterbury Co., The, Minneapolis, Minn.
Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.

HEATERS, CONVECTION

See Radiation, Convection Type

HEATERS, DUCT, ELECTRIC

Brown Fintube Co., The, Elyria, O.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Despatch Oven Co., Minneapolis, Minn.
Electromode Corp., Rochester, N. Y.
Falcon Equipment Co., New Brighton, Pa.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hynes Div., Rodman H. Martin Co., Philadelphia, Pa.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Kilbury Mfg. Co., Inc., Lawndale, Calif.
Tenney Engineering, Inc., Newark, N. J.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, DUCT, GAS

Allan Engineering Co., Dallas, Tex.
Automatic Gas Equipment Co., Pittsburgh, Pa.

Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O
Carrier Corp., Syracuse, N. Y.
Dunham Co., C. A., Chicago, Ill.
General Gas Light Co., Kalamazoo, Mich.
Great National Air Conditioning Corp., Oklahoma City, Okla.
Hayes Furnace Mfg. & Supply Co., Los Angeles, Calif.
International Sales Co., San Francisco, Calif.
Kehm Corp., The, Chicago, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Naco Mfg. Co., Huntington Park, Calif.
Norman Products Co., Inc., Columbus, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Payne Furnace Div., Affiliated Gas Equipment, Inc., Monrovia, Calif.
Reznor Mfg. Co., Mercer, Pa.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Surface Combustion Corp., Toledo, O.
United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.

HEATERS, FEEDWATER

See Deaerators

HEATERS, GASOLINE FIRED (FOR AIRCRAFT AND PORTABLE GROUND USE)

Fluid Heat Div., Anchor Post Products Inc., Baltimore, Md.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.
Surface Combustion Corp., Toledo, O.

HEATERS, INDIRECT, SUBMERGED

American District Steam Co., Inc., North Tonawanda, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Brown Fintube Co., Elyria, O.
Davis Engineering Corp., Elizabeth, N. J.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., Chicago, Ill.
Gerstein & Cooper Co., Inc., South Boston, Mass.
Graham Mfg. Co., Inc., New York, N. Y.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Penberthy Injector Co., Detroit, Mich.
Richmond Engineering Co., Inc., Richmond, Va.
Sims Co., Erie, Pa.
Superior Combustion Industries, Inc., Detroit, Mich.
Taco Heaters, Inc., Providence, R. I.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, OIL

See Preheaters, Fuel Oil: Units, Fuel Oil, Heating, Pumping and Straining

HEATERS, RADIATION, FOR SUPPLYING HOT WATER RADIATION FROM STEAM BOILER

Bell & Gossett Co., Morton Grove, Ill.
Davis Engineering Corp., Elizabeth, N. J.
Lindy Heaters, Inc., New York, N. Y.
Thrush & Co., H. A., Peru, Ind.

HEATERS, STEAM JET, FOR LIQUIDS

Duriron Co., Inc., The, Dayton, O.
Heil Process Equipment Corp., Cleveland, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
Penberthy Injector Co., Detroit, Mich.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sims Co., Erie, Pa.

HEATERS, STRIP AND IMMERSION, ELECTRIC

American Instrument Co., Inc., Silver Spring, Md.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Electro-Therm, Inc., Silver Spring, Md.
Falcon Equipment Co., New Brighton, Pa.
Fluid Systems, Inc., New Haven, Conn.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Heil Process Equipment Corp., Cleveland, O.
Hynes Div., Rodman H. Martin Co., Philadelphia, Pa.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Red Spot Electric Co., Tacoma, Wash.
Titan Mfg. Co., Buffalo, N. Y.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, SUSPENDED, RADIANT, ELECTRIC

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Trent, Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Wiegand Co., Edwin L., Pittsburgh, Pa.

HEATERS, SUSPENDED, RADIANT, GAS FIRED

Day & Night Div., Affiliated Gas Equipment, Inc., Monrovia, Calif
Nat Corp., Kansas City, Mo.
Olson & Co., Arthur A., Canfield, O.
Power Engineering Co., Chicago, Ill.

HEATERS, UNIT, ELECTRIC HEATING ELEMENT

Electromode Corp., Rochester, N. Y.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
Hynes Div., Rodman H. Martin Co., Philadelphia, Pa.
Kilbury Mfg. Co., Inc., Lawndale, Calif.
Lintern Corp., Painesville, O.
Meco, Inc., Portland, Ore.
Paley Mfg. Corp., Brooklyn, N. Y. (recessed or free standing convectors)
Red Spot Electric Co., Tacoma, Wash.
Royal Heaters, Inc., Alhambra, Calif.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wing Mfg. Co., L. J., Linden, N. J.

HEATERS, UNIT, ELECTRIC HEATING ELEMENT, EXPLOSION PROOF

Electromode Corp., Rochester, N. Y.

HEATERS, UNIT, GAS, PROPELLER FAN TYPE

Adams Mfg. Co., Cleveland, Ohio
Airtherm Mfg. Co., St. Louis, Mo.
Allan Engineering Co., Dallas, Tex.
American Blower Corp., Detroit, Mich.
American Furnace Co., St. Louis, Mo.
Automatic Gas Equipment Co., Pittsburgh, Pa.
Barwick Mfg. Corp., Wichita, Kan.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O
Carrier Corp., Syracuse, N. Y.
Clow & Sons, James B., Chicago, Ill.
Coroaire Heater Corp., The, Cleveland, O.
Dunham Co., C. A., Chicago, Ill.
General Gas Light Co., Kalamazoo, Mich.
Hastings Air Conditioning Co., Hastings, Neb.
International Sales Co., San Francisco, Calif.
Ilg Electric Ventilating Co., Chicago, Ill.
Jackson & Church Co., Saginaw, Mich.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Nat Corp., Kansas City, Mo.
National Radiator Co., The, Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
Norman Products Co., Inc., Columbus, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Reznor Mfg. Co., Mercer, Pa.
Roberts-Gordon Appliance Corp., Buffalo, N. Y.
Sonner Burner Co., Winfield, Kan.
Sterling Radiator Co., Inc., Westfield, Mass.
Surface Combustion Corp., Toledo, O.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
Utility Appliance Corp., Los Angeles, Calif.
Wing Mfg. Co., L. J., Linden, N. J.
Zink Co., John, Tulsa, Okla.

HEATERS, UNIT, STEAM AND HOT WATER, CABINET TYPE

Airtherm Mfg. Co., St. Louis, Mo.
American Blower Corp., Detroit, Mich.
American Thermal Industries, Inc., Detroit, Mich.
Brown Products Co., Forest Hills, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Hastings Air Conditioning Co., Hastings, Neb.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Nelson, Herman, Products, American Air Filter Co., Inc., Louisville, Ky.
Nesbitt, Inc., John J., Philadelphia, Pa.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Young Radiator Corp., Racine, Wis.

HEATERS, UNIT, STEAM AND HOT WATER, CENTRIFUGAL FAN TYPE

Airtherm Mfg. Co., St. Louis, Mo.
American Blower Corp., Detroit, Mich.
American Thermal Industries, Inc., Detroit, Mich.
Bayley Blower Co., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Brown Products Co., Forest Hills, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Hastings Air Conditioning Co., Hastings, Neb.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kennard Corp., St. Louis, Mo.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Nelson, Herman, Products, American Air Filter Co., Inc., Louisville, Ky.
Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Engineering Corp., Chicago, Ill.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
Young Radiator Co., Racine, Wis.

HEATERS, UNIT, STEAM AND HOT WATER, PROPELLER FAN TYPE, HORIZONTAL BLOW

Airtherm Mfg. Co., St. Louis, Mo.
American Blower Corp., Detroit, Mich.
Beacon-Morris Corp., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Clarage Fan Co., Kalamazoo, Mich.
Dunham Co., C. A., Chicago, Ill.
Fedders Quigan Corp., Buffalo, N. Y.
Grinnell Co., Inc., Providence, R. I.
Hartzell Propeller Fan Co., Piqua, O.
Ilg Electric Ventilating Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
King Co., The, Owatonna, Minn.
Kisco Boiler & Engineering Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
Modine Mfg. Co., Racine, Wis.
Muckle Mfg. Co., Owatonna, Minn.
Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
Nelson, Herman, Products, American Air Filter Co., Inc., Louisville, Ky.
Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
Power Engineering Co., Chicago, Ill.
Rittling Corp., The, Hamburg, N. Y.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wilson Engineering Corp., Chicago, Ill.
Wing Mfg. Co., L. J., Linden, N. J.
Young Radiator Co., Racine, Wis.

HEATERS, UNIT, STEAM AND HOT WATER, PROPELLER FAN TYPE, VERTICAL BLOW

Airtherm Mfg. Co., St. Louis, Mo.
American Blower Corp., Detroit, Mich.
Beacon-Morris Corp., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Clarage Fan Co., Kalamazoo, Mich.
Dunham Co., C. A., Chicago, Ill.
Fedders Quigan Corp., Buffalo, N. Y.
Grinnell Co., Inc., Providence, R. I.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
Nelson, Herman, Products, American Air Filter Co., Inc., Louisville, Ky.
Nesbitt, Inc., John J., Philadelphia, Pa.
New York Blower Co., Chicago, Ill.
Power Engineering Co., Chicago, Ill.
Rittling Corp., The, Hamburg, N. Y.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
Webster & Co., Warren, Camden, N. J.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Linden, N. J.
Young Radiator Co., Racine, Wis.

HEATERS, VENTILATION

See Surface, Finned, Heating; Ventilators, Roof, Fan; Ventilators, Unit; Surface, Finned, Heating; Ventilators, Roof, Fan

HEATERS, WALL CIRCULATING, GAS FIRED

Coroaire Heater Corp., The, Cleveland, Ohio
General Gas Light Co., Kalamazoo, Mich.
Mission Appliance Corp., Hawthorne, Calif.
Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Royal Heaters, Inc., Alhambra, Calif.
Stewart-Warner Corp., South Wind Div., Indianapolis, Ind.

HEATERS, WATER, AIR-TANKLESS

Tankless Water Heater and Compression Tank Combined

Bell & Gossett Co., Morton Grove, Ill.
General Fittings Co., Providence, R. I.
Taco Heaters, Inc., Providence, R. I.

HEATERS, WATER, CAST IRON, COAL FIRED

Adams Co., The, Dubuque, Ia.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Burnham Corp., Boiler Div., Irvington, N. Y.
Peerless Heater Div., The Eastern Foundry Co., Boyertown, Pa.
Prox Co., Inc., Frank, Terre Haute, Ind.
Smith Co., Inc., H. B., The, Westfield, Mass.
United States Radiator Corp., Detroit, Mich.
Weil-McLain Co., Michigan City, Ind.

HEATERS, WATER, ELECTRIC

Allcraft Mfg. Co., Cambridge, Mass.
Auburn Burner Co., Auburn, Ind.
Bastian-Morley Co., Inc., LaPorte, Ind.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hanson Gates Mfg. Co., Inc., Reading, Mass.
Hynes Div., Rodman H. Martin Co., Philadelphia, Pa.
Heat X Changer Co., Inc., The, Brewster, N. Y.
Hotpoint Co., Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Livingstone Engineering Co., Worcester, Mass.
Mission Appliance Corp., Hawthorne, Calif.
Red Spot Electric Co., Tacoma, Wash.
Rheem Mfg. Co., New York, N. Y.
Smith Corp., A. O., Milwaukee, Wis.
Trent Inc., Philadelphia, Pa.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Pittsburgh, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wood Co., John, Conshohocken, Pa.
York-Shipley, Inc., York, Pa.

HEATERS, WATER, GAS FIRED

Alert Boiler & Mfg. Co., Detroit, Mich.
Aldrich Co., Wyoming, Ill.
Alstrom Corp., Bronx, N. Y.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Auburn Burner Co., Auburn, Ind.
Bastian Morley Co., Inc., LaPorte, Ind.
Brown Products Co., Forest Hills, N. Y.
Bryant Corp., C. L., Cleveland, O.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Clayton Mfg. Co., El Monte, Calif.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Cleaver-Brooks Co., Milwaukee, Wis.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Crane Co., Chicago, Ill.
Day & Night Div., Affiliated Gas Equipment, Inc., Monrovia, Calif.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Dewey-Shepard Boiler Co., Indianapolis, Ind.
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.

Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Hanson-Gates Mfg. Co., Inc., Reading, Mass.
Heat Equipment, Not Inc., Chicago, Ill.
Hook & Ackerman, Inc., New York, N. Y.
Hotstream Heater Co., Cleveland, O.
Kehm Corp., The, Chicago, Ill.
Mission Appliance Corp., Hawthorne, Calif.
Montgomery Bros., San Francisco, Calif.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Mund Boilers, Inc., Los Angeles, Calif.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich
Pittsburg Water Heater Co., Pittsburgh, Pa
Rheem Mfg. Co., New York, N. Y.
Ruud Mfg. Co., Pittsburgh, Pa.
Schoedinger, F. O., Columbus, O.
Sellers Engineering Co., Chicago, Ill.
Servel, Inc., Evansville, Ind.
Smith Co., Inc., H. B., The, Westfield, Mass.
Smith Corp., A. O., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Sullivan Valve & Engineering Co., Butte, Mont.
United States Radiator Corp., Detroit, Mich
Viking Mfg. Corp., Cleveland, O.
Wood Co., John, Conshohocken, Pa.
York-Shipley, Inc., York, Pa.

HEATERS, WATER, INDIRECT

American District Steam Co., Inc., North Tonawanda, N. Y.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bell & Gossett Co., Morton Grove, Ill.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O
Copper Boiler & Heater Wks., Manitowoc, Wis.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Ferguson & Lange Foundry Co., Chicago, Ill.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., Chicago, Ill.
Graham Mfg. Co., Inc., New York, N. Y.
Hook & Ackerman, Inc., New York, N. Y.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Kehm Corp., The, Chicago, Ill.
Lewis & Co., Joseph E., Baltimore, Md.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
National Radiator Co., The, Johnstown, Pa.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Sellers Engineering Co., Chicago, Ill.
Sims Co., Erie, Pa.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, WATER, INDIRECT, COMBINATION TANK AND TANKLESS

Bell & Gossett Co., Morton Grove, Ill.
Birchfield Boiler, Inc., Tacoma, Wash.
Burnham Corp., Boiler Div., Irvington, N. Y.
Carpenter Heating & Stoker Co., Cleveland, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Crotty Mfg. Corp., Long Island, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Eclipse Fuel Engineering Co., Rockford, Ill.
General Fittings Co., Providence, R. I.
Heat Equipment, Not Inc., Chicago, Ill.
Hook & Ackerman, Inc., New York, N. Y.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
Penberthy Injector Co., Detroit, Mich.
Richmond Engineering Co., Inc., Richmond, Va.
Sims Co., Erie, Pa.
Taco Heaters, Inc., Providence, R. I.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, WATER, OIL FIRED

Air Devices, Inc., New York, N. Y.
Aldrich Co., Wyoming, Ill.
Alstrom Corp., Bronx, N. Y.
Auburn Burner Co., Auburn, Ind.
Bastian-Morley Co., Inc., LaPorte, Ind.
Brown Products Co., Forest Hills, N. Y.
Century Engineering Corp., Cedar Rapids, Ia.
Clayton Mfg. Co., El Monte, Calif.
Cleaver-Brooks Co., Milwaukee, Wis.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Dewey-Shepard Boiler Co., Indianapolis, Ind.
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Electrol Burner Mfg. Co., Inc., Rutherford, N. J.
Fitzgibbons Boiler Co., Inc., New York, N. Y.
Hanson-Gates Mfg. Co., Inc., Reading, Mass.
Heat Equipment, Not Inc., Chicago, Ill.
Hotstream Heater Co., Cleveland, O.
Johnson Co., S. T., Philadelphia, Pa.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Mund Boilers, Inc., Los Angeles, Calif.
Norse Boiler Co., Inc., New Market, N. J.
Nu-Way Corp., The, Rock Island, Ill.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich
Portmar Boiler Co., Inc., Brooklyn, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Ray Oil Burner Co., San Francisco, Calif.
Reif-Rexoil, Inc., Buffalo, N. Y.
Rheem Mfg. Co., New York, N. Y.
Rite Engineering & Mfg. Corp., Los Angeles, Calif.
Scott-Newcomb, Inc., St. Louis, Mo.
Shephard Heater Co., Inc., Terre Haute, Ind.
Smith Co., Inc., H. B., The, Westfield, Mass.
Sullivan Valve & Engineering Co., Butte, Mont.
United States Radiator Corp., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Viking Mfg. Corp., Cleveland, O.

HEATERS, WATER, STEAM, INSTANTANEOUS

Aerco Corp., Englewood, New Jersey
Alstrom Corp., Bronx, N. Y.
American District Steam Co., Inc., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Coe Mfg. Co., Painesville, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Duffy Engrg. Co., Portland, Ore.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fitzgibbons Boiler Co., Inc., New York, N. Y.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., Chicago, Ill.
Gerstein & Cooper Co., Inc., South Boston, Mass.
Graham Mfg. Co., Inc., New York, N. Y.
Hasco Valve & Machine Co., Milwaukee, Wis.
Howard Iron Wks. & Alberger Heater Div., Buffalo, N. Y.
International Engineering Wks., Inc., Framingham, Mass.
Johnson Corp., The, Three Rivers, Mich.
Keckley Co., O. C., Chicago, Ill.
Kewanee-Ross Corp., Kewanee, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lewis & Co., Joseph E., Baltimore, Md.
Lindy Heaters, Inc., New York, N. Y.
Manning & Lewis Engineering Co., Newark, N. J.
Marion Machine Foundry & Supply Co., Marion, Ind.
Montgomery Bros., San Francisco, Calif.
National Pipe Bending Co., New Haven, Conn.
O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pick Mfg. Co., West Bend, Wis. (direct steam injection)
Richmond Engineering Co., Inc., Richmond, Va.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sims Co., Erie, Pa.
Swartwout Co., The, Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters, Inc., New York, N. Y.

HEATERS, WATER, STEAM, STORAGE

Aerco Corp., Englewood, N. J.
Alert Boiler & Mfg. Co., Detroit, Mich.
American District Steam Co., Inc., North Tonawanda, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Birchfield Boiler, Inc., Tacoma, Wash.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Burnham Corp., Boiler Div., Irvington, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Dahlquist Mfg. Co., Inc., Div. of Process Engineering Inc., Somerville, Mass.
Davis Engineering Corp., Elizabeth, N. J.
Fitzgibbons Boiler Co., Inc., New York, N. Y.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., Chicago, Ill.
Gerstein & Cooper Co., Inc., South Boston, Mass.
Hoppes Mfg. Co., Inc., Springfield, O.
Howard Iron Wks. & Alberger Heater Div., Buffalo, N. Y.
Johnson Corp., The, Three Rivers, Mich.
Keckley Co., O. C., Chicago, Ill.
Kewanee-Ross Corp., Kewanee, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lindy Heaters, Inc., New York, N. Y.
Manitowoc Shipbuilding, Inc., Manitowoc, Wis.
Manning & Lewis Engineering Co., Newark, N. J.
Marion Machine Foundry & Supply Co., Marion, Ind.

National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Penberthy Injector Co., Detroit, Mich.
Quaker City Iron Works, Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Schaub Engineering Co., Fred H., Chicago, Ill.
Sims Co., Erie, Pa.
Stout & Sons, David, St. Louis, Mo.
Swartwout Co., The, Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Vogt Machine Co., Henry, Louisville, Ky.
Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.
Yula Water Heaters Inc., New York, N. Y.

HEATERS, WATER, STEEL, COAL FIRED

Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Catskill Metal Works, Inc., Catskill, N. Y.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Fitzgibbons Boiler Co., Inc., New York, N. Y.
Heat Equipment, Not Inc., Chicago, Ill.
International Engineering Wks., Inc., Framingham, Mass.
Johnston Bros., Inc., Ferrysburg, Mich.
Kewanee-Ross Corp., Kewanee, Ill.
Pacific Steel Boiler Div., United States Radiator Corp., Detroit, Mich.
Terre Haute Boiler Works, Co., Terre Haute, Ind.

HEATING BOILERS

See Boilers, Heating

HEATING COILS

See Surface, Heating

HEATING SURFACE

See Surface, Heating

HOODS, FUME DISPOSAL, LABORATORY

Kewaunee Mfg. Co., Adrian, Mich.
Sheldon Equipment Co., E. H., Muskegon, Mich.

HOSE CLAMPS

See Clamps, Hose

HOSE, METAL, AND FITTINGS

Aero-Coupling Corp., Burbank, Calif.
Aeroquip Corp., Jackson, Mich.
American Metal Hose Branch, The American Brass Co., Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
Brockway Co., Naugatuck, Conn.
Chiksan Co., Brea, Calif.
Everhot Products Co., Chicago, Ill.
Flexible Metal Hose Mfg. Co., Costa Mesa, Calif.
Flexonics Corp., Maywood, Ill.
Gil-Lair Products, Inc., Pasadena, Calif.
Johnson Metal Hose, Inc., Waterbury, Conn.
Norgren Co., C. A., Englewood, Colo.
Packless Metal Hose, Inc., New Rochelle, N. Y.
Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Seamlex Co., Inc., Long Island City, N. Y.
Techniflex Corp., Port Jervis, N. Y.
Titeflex, Inc., Newark, N. J.
United Metal Hose Co., Inc., Long Island City, N. Y.

HOSE, NON-METAL, AND FITTINGS

Aero-Coupling Corp., Burbank, Calif.
Aeroquip Corp., Jackson, Mich.
American Ventilating Hose Co., New York, N. Y.
Arrowhead Rubber Co., Downey, Calif.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Continental Rubber Works, Erie, Pa.
De Vilbiss Co., The, Toledo, O.
Flexible Tubing Corp., Guilford, Conn.
Gates Rubber Co., The, Denver, Colo.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Henry Valve Co., Melrose Park, Ill.
Independent Pneumatic Tool Co., Aurora, Ill.
New York Belting & Packing Co., Passaic, N. J.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber and Tire Corp., Youngstown, O.
Resistoflex Corp., Belleville, N. J.
Roylyn, Inc., Glendale, Calif.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Techniflex Corp., Port Jervis, N. Y.
Thermoid Co., Trenton, N. J.
United States Rubber Co., New York, N. Y.
Weatherhead Co., The, Cleveland, O.

HOSE, VENTILATING

See Ducts and Duct Fittings, Prefabricated, Non-Metallic

HOT GAS DEFROSTING

See Systems, Hot Gas Defrosting for Refrigeration

HOT WATER HEATING SYSTEMS

See Systems, Heating, Hot Water

HOT WATER HEATING SYSTEMS, BALANCING ELBOWS FOR

See Elbows, Balancing, For Hot Water Heating System

HOT WATER PRESSURE REGULATORS

See Regulators, Pressure, Hot Water Heating Systems

HOUSINGS, FAN, CENTRIFUGAL

(Housing only—not complete fans)

Bishop & Babcock Mfg. Co., Cleveland, O.
Champion Blower & Forge Co., Lancaster, Pa.
Cincinnati Metalcrafts Inc., Cincinnati, O.
Clarage Fan Co., Kalamazoo, Mich.
Commercial Shearing & Stamping Co., Youngstown, O.
Detroit Stamping Co., Detroit, Mich.
General Blower Co., Morton Grove, Ill.
Hastings Air Conditioning Co., Hastings, Neb.
Haveg Corp., Newark, Del. (plastic for corrosive fumes)
Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
Maysteel Products, Inc., Milwaukee, Wis.
Northern Blower Co., Cleveland, O.
Palmer Mfg. Corp., Phoenix, Ariz.
Revcor, Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Torit Mfg. Co., St. Paul, Minn.
United States Air Conditioning Corp., Minneapolis, Minn.
Utica Products, Inc., Utica, N. Y.

HOUSINGS, FAN, PROPELLER

(Housings only—not complete fans)

Allen Ventilator Div., Production Planning Co., Rochester, Mich.
Barnes Co., A. D., Dayton, O.
Cincinnati Metalcrafts Inc., Cincinnati, O.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Commercial Shearing & Stamping Co., Youngstown, O.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Haveg Corp., Newark, Del. (plastic for corrosive fumes)
Palmer Mfg. Corp., Phoenix, Ariz.
Revcor, Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.

HUMIDIFIERS, CENTRAL PLANT

Air & Refrigeration Corp., New York, N. Y.
American Blower Corp., Detroit, Mich.
American Foundry & Furnace Co., Bloomington, Ill.
American Moistening Co., Providence, R. I.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Armstrong Machine Wks., Three Rivers, Mich.
Bahnson Co., Winston-Salem, N. C.
Barber-Colman Co., Rockford, Ill.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Cleveland Humidifier Co., Cleveland, O.
Farr Co., Los Angeles, Calif.
Grinnell Co., Inc., Providence, R. I.
Johnson Service Co., Milwaukee, Wis.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla. (vaporizers for humidifiers)
McDonnell & Miller, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Air Conditionng Inc., Johnstown, Pa.
National Engineering & Mfg. Co., Kansas City, Mo.
Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
Powers Regulator Co., Skokie, Ill.
Roberson Co., L. N., Seattle, Wash.
Surface Combustion Corp., Toledo, O.
Trane Co., The, LaCrosse, Wis.
Vilter Mfg. Co., Milwaukee, Wis.
York Corp., York, Pa.

HUMIDIFIERS, DIRECT, SPRAY HEAD

Abbeon Supply Co., Jamaica, N. Y.
American Moistening Co., Providence, R. I.
Anetsberger Bros., Inc., Northbrook, Ill.
Bahnson Co., Winston-Salem, N. C. (Centrifugal)
Binks Mfg. Co., Chicago, Ill.
Blower Application Co., Milwaukee, Wis.
Buffalo Forge Co., Buffalo, N. Y.
Drying Systems, Inc., Chicago, Ill.

Grinnell Co., Inc., Providence, R. I.
Maid-O'Mist, Inc., Chicago, Ill.
Manufacturers Machine Co., North Andover, Mass
Marley Co., Inc., The, Kansas City, Kans.
Marlo Coil Co., St. Louis, Mo.
Murray Mfg. Co., D. J., Wausau, Wis.
Paasche Airbrush Co., Chicago, Ill.
Parks-Cramer Co., Fitchburg, Mass.
Pfening Co., Fred D., Columbus, O.
Rhode Island Humidifier & Ventilating Co., Boston, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Somers, Inc., H. J., Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Co., Bellwood, Ill.
Supreme Electric Products Corp., Rochester, N. Y.
Trane Co., The, LaCrosse, Wis.
Water Cooling Corp., New York, N. Y.

HUMIDIFIERS FOR RADIATORS AND CONVECTORS

Kauffman Air Conditioning Corp., St. Louis, Mo.
Maid-O'-Mist, Inc., Chicago, Ill.
Skilbeck Mfg. Co., Kenosha, Wis.
Techtmann Industries, Inc., Milwaukee, Wis.

HUMIDIFIERS, RADIATOR VENT VALVE

G & H Mfg. Co., Philadelphia, Pa.
Maid-O'Mist, Inc., Chicago, Ill.
Skilbeck Mfg. Co., Kenosha, Wis.

HUMIDIFIERS, UNIT, ROOM TYPE (Without Heating)

Abbeon Supply Co., Jamaica, N. Y.
American Moistening Co., Providence, R. I.
Armstrong Machine Wks., Three Rivers, Mich.
Associated Mills, Chicago, Ill.
Bahnson Co., Winston Salem, N. C.
Crowell & Dunn, Inc., New York, N. Y.
Daffin Mfg. Co., Lancaster, Pa.
Fresh'nd-Aire Co., Div. of Cory Corp., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Health Trola Div., Excel Heating & Air Conditioning Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.
Murray Mfg. Co., D. J., Wausau, Wis.
National Engineering & Mfg. Co., Kansas City, Mo.
Palmer Mfg. Corp., Phoenix, Ariz.
Somers, Inc., H. J., Detroit, Mich.
Spraying Systems Co., Bellwood, Ill.
Standard Engineering Wks., Pawtucket, R. I.
Tempmaster Corp., Kansas City, Mo.
Walton Laboratories, Inc., Irvington, N. J.
Water Cooling Corp., New York, N. Y.

HUMIDIFYING RADIATORS

See Radiators, Humidifying

HUMIDISTATS

Abbeon Supply Co., Jamaica, N. Y.
American Instrument Co., Silver Spring, Md.
American Moistening Co., Providence, R. I.
Bahnson Co., Winston-Salem, N. C.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
General Controls Co., Glendale, Calif.
Johnson Service Co., Milwaukee, Wis.
Minneapolis Honeywell Regulator Co., Minneapolis, Minn
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Standard Engineering Wks., Pawtucket, R. I.
Walton Laboratories, Inc., Irvington, N. J.

HUMIDITY INDICATORS

See Indicator-Controllers, Relative Humidity; Psychrometers

HUMIDITY RECORDERS

See Recorders, Humidity

HUMIDITY AND TEMPERATURE CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

HYDRAULIC PIPE PUSHERS

See Pushers, Pipe, Hydraulic

HYDRAULIC SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling

HYGROMETERS

American Instrument Co., Inc., Silver Spring, Md.
American Moistening Co., Providence, R. I.
Bristol Co., The, Waterbury, Conn.
Daigger & Co., A., Chicago, Ill.
Fee and Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
General Scientific Equipment Co., Philadelphia, Pa.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon & Co., Chicago, Ill.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.
Will Corp., Rochester, N. Y.

HYGROSTATS

See Humidistats

IDENTIFICATION MARKERS (For Piping Services)

Brady Co., W. H., Chippewa Falls, Wis.
Western Lithograph Co., Los Angeles, Calif.

IMMERSION THERMOSTATS

See Thermostats, Immersion

INCINERATORS, FOR LARGE BUILDINGS

Gober Incinerator Corp., Chicago, Ill.

INDICATING THERMOMETERS

See Thermometers, Indicating

INDICATOR-CONTROLLERS, PRESSURE

Automatic Control Co., St. Paul, Minn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Davis Regulator Co., Chicago, Ill.
Electro Products Laboratories, Inc., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Illinois Engineering Co., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
United States Gauge, Div. of American Machine and Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

INDICATOR-CONTROLLERS, RELATIVE HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.

Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
United States Gauge, Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

INDICATOR-CONTROLLERS, TEMPERATURE

American Instrument Co., Inc., Silver Spring, Md.
Automatic Temperature Control Co., Inc., Philadelphia, Pa
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Cooper Co., Clark, Palmyra, N. J.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Illinois Engineering Co., Chicago, Ill.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia Pa.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa
Powers Regulator Co., Skokie, Ill.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Smith Control & Instrument Corp., Palmyra, N. J.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United Electric Controls Co., Watertown, Mass.
United States Gauge, Div. of American Machine and Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Wiegand Co., Edwin L., Pittsburgh, Pa.

INDICATORS, CARBON DIOXIDE, BOILER ROOM

For Portable CO_2 Analyzers, See Analyzers, Carbon Dioxide, Portable

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., Newark, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engelhard, Inc., Chas., Newark, N. J.
Ess Instrument Co., Bergenfield, N. J.
General Power Plant Corp., Ossining, N. Y.
Hays Corp., Michigan City, Ind.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.

INDICATORS, DEW POINT

American Instrument Co., Inc., Silver Spring, Md.
Foxboro Co., Foxboro, Mass.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.

INDICATORS, FLOW

See Meters, Flow

INDICATORS, LIQUID LEVEL, BOILER AND TANK

Automatic Control Co., St. Paul, Minn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Boston Auto Gage Co., Pittsfield, Mass.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
B/W Controller Corp., Birmingham, Mich.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Brass & Malleable Works, Detroit, Mich.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Frick Co., Waynesboro, Pa.
Gasoilair Equipment Co., New Haven, Conn.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
Henry Valve Co., Melrose Park, Ill.
Liquidepth Indicators, Inc., Long Island City, N. Y.
Magnetrol, Inc., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McDonnell & Miller, Inc., Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Newark Controls Co., Bloomfield, N. J.
Penberthy Injector Co., Detroit, Mich.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Petrometer Corp., Long Island City, N. Y.
Reliance Gauge Column Co., Cleveland, O.
Rochester Mfg. Co., Inc., Rochester, N. Y.
Swift Lubricator Co., Elmira, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Yarnall-Waring Co., Philadelphia, Pa.

INDICATORS, pH

American Instrument Co., Inc., Silver Spring, Md.
Analytical Measurements, Inc., Chatham, N. J.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Madden Corp., The, Chicago, Ill.
Photovolt Corp., New York, N. Y.

INDICATORS, RELATIVE HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
American Moistening Co., Providence, R. I.
Fee and Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Trerice Co., H. O., Detroit, Mich.
Walton Laboratories, Inc., Irvington, N. J.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

INDICATORS, SOUND LEVEL

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hermon Hosmer Scott, Inc., Cambridge, Mass.

INDIRECT HEATING SURFACE

See Surface, Heating

INDIRECT WATER HEATERS

See Heaters, Water, Indirect

INDUSTRIAL AIR CONDITIONERS

See Units, Air Conditioning, Industrial Type

INDUSTRIAL DRYERS

See Dryers, Industrial

INJECTOR RECIRCULATORS FOR REFRIGERANTS

Phillips & Co., H. A., Chicago, Ill.

INSERTS, CONCRETE

Carty & Moore Engineering Co., Detroit, Mich.
Healy Ruff Co., St. Paul, Minn.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Truscon Steel Co., Youngstown, O.
Unistrut Products Co., Chicago, Ill.

INSTANTANEOUS WATER HEATERS

See Heaters, Water, Steam, Instantaneous

INSULATING CONCRETE

See Concrete, Insulating

INSULATION ANCHORS AND ADHESIVES

See Fasteners, Insulation

INSULATION, BOILER AND TANK

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Alton Mineral Wool Insulation Co., St. Louis, Mo.
Armstrong Cork Co., Lancaster, Pa. (85% Magnesia)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Bigelow Liptak Corp., Detroit, Mich.
Bird-Archer Co., Philadelphia, Pa.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chicago Fire Brick Co., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O.
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Magnesia)
Forty-Eight Insulations, Inc., Aurora, Ill.
Glass Fibers, Inc., Toledo, O.
Grant Wilson Inc., Chicago, Ill.
Green Fire Brick Co., Mexico, Mo.
International Vermiculite Co., Girard, Ill.
Johns-Manville, New York, N. Y.
Kaylo Div., Owens-Illinois Glass Co., Toledo, O.
Keasbey Co., Robert A., New York, N. Y. (Asbestos)
Keasbey & Mattison Co., Ambler, Pa.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Co., St. Louis, Mo.
Lockport Cotton Batting Co., Lockport, N. Y.
Monsanto Chemical Co., Merimac Div., Boston, Mass.
Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steele, Inc., South Boston, Mass.
National Cork Co., Englewood, N. J. (Corkboard)
National Gypsum Co., Buffalo, N. Y. (Rock wool)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos and magnesia)
Owens-Corning Fiberglas Corp., Toledo, O. (Board)
Pabco Products Inc., San Francisco, Calif.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Reflectal Corp., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y. (Blanket, block cement)
Robinson Industries, Coleman, Mich. (expanded plastic)
Ruberoid Co., New York, N. Y. (Asbestos, magnesia)
Sall Mountain Co., Hamilton, O.
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J.
Standard Asbestos Mfg. Co., Chicago, Ill.
Standard Fuel Engineering Co., Detroit, Mich.
Telsit Insulation Co., Bronx, N. Y.
Union Asbestos & Rubber Co., Chicago, Ill.
United Cork Co., Kearney, N. J. (Cork)
United States Mineral Wool Co., Stanhope, N. J.
Walker Jamar Co., Duluth, Minn.
Western Mineral Products Co., Minneapolis, Minn.
Zonolite Co., Chicago, Ill. (plastic)

INSULATION, BUILDING

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Rock wool)
Air-O-Cel Co., Detroit, Mich.
Alton Mineral Wool Insulation Co., St. Louis, Mo.
American Flange & Mfg. Co., Inc., New York, N. Y. (Metal sheets)
Armstrong Cork Co., Lancaster, Pa. (Corkboard, fibre board)
Bache & Co., Semon, New York, N. Y. (Glass wool)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O. (Rock wool)
Carney Co., Inc., The, Mankato, Minn.
Celotex Corp., The, Chicago, Ill.
Certain-teed Products Corp., Ardmore, Pa.
Chamberlin Co. of America, Detroit, Mich.
Cork Insulation Co., Inc., New York, N. Y. (Corkboard)
Dodge Cork Co., Inc., Lancaster, Pa.
Eagle-Picher Co., Cincinnati, O. (Mineral wool, blankets, batts, granulated, loose)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Fir-tex Insulating Board Co., St. Helens, Ore. (Wood fibre-board)
Flintkote Co., The, New York, N. Y. (Glass wool)
Forty-Eight Insulations, Inc., Aurora, Ill.
General Insulating Products Co., Brooklyn, N. Y. (Rock wool)
Glass Fibers, Inc., Toledo, O.
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Hogan & Co., Inc., C. T., New York, N. Y. (reflective)
Infra Insulation, Inc., New York, N. Y. (reflective)
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn (Wool fibre)
Insul-Wool Insulation Corp., Wichita, Kans.
International Vermiculite Co., Girard, Ill. (Loose fill)
Isoflex Corp., San Francisco, Calif.
Johns-Manville, New York, N. Y. (Rock wool and wood fibre-board)
Johnston Foil Mfg. Co., St. Louis, Mo. (Foil, aluminum, tin, lead)
Kaylo Div., Owens-Illinois Glass Co., Toledo, O.
Kimberly-Clark Corp., Neenah, Wis.
Libbey-Owens-Ford Glass Co., Toledo, O.
Lockport Cotton Batting Co., Lockport, N. Y.
Masonite Corp., Chicago, Ill. (Blanket)
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Multi-Cell Sales Corp., Minneapolis, Minn. (Blanket, quilted newspaper)
Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn & Steele, Inc., South Boston, Mass.
National Cork Co., Englewood, N. J. (Corkboard)
National Gypsum Co., Buffalo, N. Y.
Nelson Mfg. Co., B. F., Minneapolis, Minn.
Owens-Corning Fiberglas Corp., Toledo, O.
Pacific Lumber Co., The, San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Plastergon Wall Board Co., Buffalo, N. Y. (Rigid board)
Poe Co., C. W., Cleveland, O.
Reflectal Corp., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y. (Rock, slag wool)
Reynolds Metals Co., Louisville, Ky.
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Russell Co., F. C., The, Cleveland, O.
Silvercote Products, Inc., Chicago, Ill.
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hairfelt)
Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)
Tennessee Products and Chemical Corp., Nashville, Tenn.
United Cork Companies, Kearny, N. J. (Cork)
United States Gypsum Co., Chicago, Ill. (Wool and board)
United States Mineral Wool Co., Stanhope, N. J. (Mineral wool)
Universal Gypsum & Lime Co., Chicago, Ill. (Loose fill)
Western Mineral Products Co., Minneapolis, Minn.
Wilson & Co., Inc., Chicago, Ill. (Board)
Wood Conversion Co., St. Paul, Minn.
Zonolite Co., Chicago, Ill. (Loose fill)

INSULATION, DUCT, SOUND DEADENING

For Application Inside Duct

American Hair & Felt Co., Chicago, Ill.
Baldwin-Hill Co., Trenton, N. J.
Celotex Corp., The, Chicago, Ill.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felters Company, The, Boston, Mass.
Flintkote Co., The, New York, N. Y.
Glass Fibers, Inc., Toledo, O.
Grant Wilson, Inc., Chicago, Ill.
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Industrial Acoustics Co., New York, N. Y.
Industrial Sound Control, Inc., Hartford, Conn.
Insulite Div., Minnesota and Ontario Paper Co., Minneapolis, Minn
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Kimberly-Clark Corp., Neenah, Wis.
Lockport Cotton Batting Co., Lockport, N. Y.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Mortell Co., J. W., Kankakee, Ill.
Owens-Corning Fiberglas Corp., Toledo, O.
Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)
Telsit Insulation Co., Bronx, N. Y.
Thompson & Co., Oakmont, Pa.
United States Rubber Co., New York, N. Y.
Western Felt Works, Chicago, Ill.
Zonolite Co., Chicago, Ill.

INSULATION, DUCT, THERMAL

Acme Asbestos Covering & Flooring Co., Chicago, Ill. (Asbestos)
Air-O-Cel Co., Detroit, Mich.
American Flange & Mfg. Co., Inc., New York, N. Y.
American Hair & Felt Co., Chicago, Ill. (Hair felt)
Armstrong Cork Co., Lancaster, Pa. (Corkboard)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J.
Bigelow Liptak Corp., Detroit, Mich.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O. (Asbestos)
Celotex Corp., The, Chicago, Ill.
Cork Insulation Co., Inc., New York, N. Y. (Corkboard)
Dodge Cork Co., Inc., Lancaster, Pa.
Eagle-Picher Co., Cincinnati, O. (Mineral wool blankets)
Ehret Magnesia Mfg. Co., Valley Forge, Pa. (Cork, magnesia, hair felt)
Felters Company, The, Boston, Mass. (Wool felt)
Fir-Tex Insulating Board Co., St. Helens, Ore. (Wood fibreboard)
Flintkote Co., The, New York, N. Y. (fibrated, asphalt spray-On)
Forty-Eight Insulations, Inc., Aurora, Ill.
General Insulating Products Co., Brooklyn, N. Y. (Acoustic rock wool)
Glass Fibers, Inc., Toledo, O.
Grant Wilson Inc., Chicago, Ill.
Gustin-Bacon Mfg. Co., Kansas City, Mo.
Hinde & Dauch Paper Co., Sandusky, O.
Infra Insulation, Inc., New York, N. Y.
Insulite Div. Minnesota and Ontario Paper Co., Minneapolis, Minn (Wood fibre)
International Vermiculite Co., Girard, Ill. (Block)
Isoflex Corp., San Francisco, Calif.
Johns-Manville, New York, N. Y. (Rock cork, asbestos)

Kaylo Div., Owens-Illinois Glass Co., Toledo, O.
Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos)
Kimberly-Clark Corp., Neenah, Wis.
Lockport Cotton Batting Co., Lockport, N. Y.
Masonite Corp., Chicago, Ill.
Mineral Insulation Co., Chicago Ridge, Ill. (Rock wool)
Minnesota Mining & Mfg. Co., St. Paul, Minn.
Mortell Co., J. W., Kankakee, Ill.
Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steele, Inc., South Boston, Mass.
National Cork Co., Englewood, N. J. (Corkboard)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos and wool felt)
Owens-Corning Fiberglas Corp., Toledo, O. (Blanket)
Pabco Products Inc., San Francisco, Calif.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Poe Co., C. W., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Reflectal Corp., New York, N. Y.
Refractory & Insulation Corp., New York, N. Y. (Block, blanket)
Reynolds Metals Co., Louisville, Ky.
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Ruberoid Co., New York, N. Y. (Asbestos cellular and laminated sheets or blocks)
Sall Mountain Co., Hamilton, O. (Asbestos)
Schundler & Co., Inc., F. E., Long Island City, N. Y.
Smith & Kanzler Corp., Linden, N. J. (Asbestos air cell type)
Sprayo-Flake Co., Chicago, Ill.
Standard Asbestos Mfg. Co., Chicago, Ill. (Asbestos, hair felt)
Stic-Klip Mfg. Co., Cambridge, Mass. (Insulation fasteners)
Telsit Insulation Co., Bronx, N. Y.
Union Asbestos & Rubber Co., Chicago, Ill.
United Cork Companies, Kearny, N. J. (Cork)
United States Mineral Wool Co., Stanhope, N. J.
Western Felt Wks., Chicago, Ill. (Felt)
Wilson & Co., Inc., Chicago, Ill.
Zonolite Co., Chicago, Ill. (plastic)

INSULATION FASTENERS

See Fasteners, Insulation

INSULATION, FINISHING CEMENT

Baldwin-Hill Co., Trenton, N. J.
Chicago Fire Brick Co., Chicago, Ill.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Forty-Eight Insulations, Inc., Aurora, Ill.
Grant Wilson, Inc., Chicago, Ill.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Ruberoid Co., New York, N. Y.

INSULATION, PIPE

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
American Gilsonite Co., Salt Lake City, Utah
American Hair & Felt Co., Chicago, Ill.
Armstrong Cork Co., Lancaster, Pa. (Cork, 85% mag, air cell, Hy-Temp.)
Badham Insulation Co., Inc., Birmingham, Ala.
Baldwin-Hill Co., Trenton, N. J. (Rock wool)
Bigelow Liptak Corp., Detroit, Mich.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O. (Asbestos, magnesia)
Cork Insulation Co., New York, N. Y. (cork)
Durant Insulated Pipe Co., Palo Alto, Calif. (Underground)
Durant International Corp., Williamstown, N. J. (underground)
Eagle-Picher Co., Cincinnati, O. (Mineral wool)
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Forty-Eight Insulations, Inc., Aurora, Ill.
Grant Wilson Inc., Chicago, Ill.
Gro-Quick Co., Chicago, Ill. (glass fiber and flexible tape)
International Vermiculite Co., Girard, Ill. (Vermiculite)
Johns-Manville, New York, N. Y. (Asbestos, magnesia, rock cork)
Kaylo Div., Owens-Illinois Glass Co., Toledo, O.
Keasbey Co., Robert A., New York, N. Y. (Asbestos and cork)
Keasbey & Mattison Co., Ambler, Pa. (Asbestos, magnesia)
Lynch Asbestos Co., Los Angeles, Calif.
Masonite Corp., Chicago, Ill.
Minnesota Mining & Mfg. Co., St. Paul, Minn. (Spray)
Mortell Co., J. W., Kankakee, Ill. (plastic cork)
Mundet Cork Corp., North Bergen, N. J. (Cork)
Munn and Steele, Inc., South Boston, Mass.
Mystik Adhesive Products, Div. of Chicago Show Printing Co., Chicago, Ill.
National Cork Co., Englewood, N. J. (Corkboard)
National Gypsum Co., Buffalo, N. Y. (Moulded)
Norristown Magnesia & Asbestos Co., Norristown, Pa. (Asbestos, magnesia)
Owens-Corning Fiberglas Corp., Toledo, O.
Pabco Products Inc., San Francisco, Calif.
Pacific States Felt Mfg. Co., Inc., San Francisco, Calif.
Pittsburgh Corning Corp., Pittsburgh, Pa.
Poe Co., C. W., Cleveland, O.
Porter & Co., Inc., H. W., Newark, N. J. (Underground)
Presstite Engineering Co., St. Louis, Mo.

Reflectal Corp., New York, N. Y. (foil and corrugated paper)
Ric-wiL Co., Cleveland, O.
Robinson Industries, Coleman, Mich. (expanded plastic)
Ruberoid Co., New York, N. Y. (Asbestos, magnesia, calsilite)
Sall Mountain Co., Hamilton, O. (Asbestos and wool felt)
Smith & Kanzler Corp., Linden, N. J. (Asbestos air cell, wool felt and hair felt)
Sponge Rubber Products Co., The, Shelton, Conn. (cellular rubber)
Standard Asbestos Mfg. Co., Chicago, Ill.
Union Asbestos & Rubber Co., Chicago, Ill.
United Cork Companies, Kearny, N. J.
Walker Jamar Co., Duluth, Minn.
Western Mineral Products Co., Minneapolis, Minn. (Underground)
Wilson & Co., Chicago, Ill. (hairfelt)
Wood Conversion Co., St. Paul, Minn.
Zonolite Co., Chicago, Ill. (underground)

IONIZATION APPARATUS

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
General Ozone Corp., Chicago, Ill.
Montgomery Bros., San Francisco, Calif.
United States Ozone Co. of America, Scottdale, Pa.
Welsbach Corp., The, Ozone Processes Div., Philadelphia, Pa.

IRON BODY VALVES

See Valves, Gate; and Valves, Globe

JACKETED PIPE

See Pipe, Jacketed

JACKETING FOR PIPE INSULATION

See Protectors, Pipe Covering

JETS, OVERFIRE AIR, FOR SMOKE ABATEMENT

Canton Stoker Corp., Canton, O.
Eclipse Fuel Engineering Co., Rockford, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
North American Mfg. Co., Cleveland, O.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Power Engineering Co., Chicago, Ill.
Reintjes Co., Geo. P., Kansas City, Mo.
Sterns-Flinn Corp., New York, N. Y.

JOINTS, PIPE, ELECTRICAL INSULATING

American Hard Rubber Co., New York, N. Y.
Barco Mfg. Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.

JOINTS, PIPE, EXPANSION, PACKLESS

American District Steam Co., Inc., North Tonawanda, N. Y.
Badger Fire Extinguisher Co., Somerville, Mass.
Badger Mfg. Co., Cambridge, Mass. (Corrugated copper, stainless steel)
Cook Electric Co., Chicago, Ill.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Flexonics Corp., Maywood, Ill.
Foster Wheeler Corp., New York, N. Y.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Garlock Packing Co., Palmyra, N. Y. (rubber)
Harris & Co., Arthur, Chicago, Ill.
Kopperman & Sons, Joseph, Philadelphia, Pa.
MagniLastic Div., Cook Electric Co., Chicago, Ill.
National Valve & Mfg. Co., Pittsburgh, Pa.
Northern Indiana Brass Co., Elkhart, Ind.
Ric-wiL Co., Cleveland, O.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Techniflex Corp., Port Jervis, N. Y.
United States Rubber Co., New York, N. Y.
Walworth Co., New York, N. Y.
Zallea Brothers, Wilmington, Del.

JOINTS, PIPE, EXPANSION, SLIP

American District Steam Co., Inc., North Tonawanda, N. Y.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Clow & Sons, James B., Chicago, Ill.
Crane Co., Chicago, Ill.
Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Howard Iron Works & Alberger Heater Div., Buffalo, N. Y.
Illinois Engineering Co., Chicago, Ill.
Jarecki, Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Northern Indiana Brass Co., Elkhart, Ind.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Powell Co., Wm., Cincinnati, O.
Q-P Mfg. Co., Needham Heights, Mass.
Royalton Co., Inc., Gasport, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.

United States Gasket Co., Camden, N. J.
Walworth Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.
Webster & Co., Warren, Camden, N. J.
Yarnall-Waring Co., Philadelphia, Pa.

JOINTS, PIPE, FLEXIBLE, SWING AND REVOLVING

Barco Mfg. Co., Chicago, Ill.
Bordo Co., Inc., L. J., Glenside, Pa.
Chiksan Co., Brea, Calif.
Flexo Supply Co., Inc., St. Louis, Mo.
Gil-Lair Products, Inc., Pasadena, Calif.
Johnson Corp., The, Three Rivers, Mich.
Mayson Mfg. Co., Detroit, Mich.
Moran Flexible Joint Co., Inc., Louisville, Ky.
Patterson-Ballagh Corp., Los Angeles, Calif.
Powell Co., Wm., Cincinnati, O.

JOINTS, UNIVERSAL, FOR OPERATING VALVES

Blood Brothers Machine Co., Allegan, Mich.
Brooks Equipment Corp., Hoboken, N. J.
Chicago Die Casting Mfg. Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Piezo Mfg. Corp., New York, N. Y.

KATA THERMOMETERS

See Thermometers, Kata

KITS, COMBUSTION TESTING

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Victory Engineering Corp., Union, N. J.

LACQUERS

See Enamels and Lacquers

LAGGING ADHESIVES

See Adhesives, for Pipe Covering

LAMPS, STERILIZING, FOR DUCT INSTALLATION

Coleman-Petterson Corp., Cleveland, O.
Cooper Hewitt Electric Co., Hoboken, N. J.
Fuller Co., D. William, Chicago, Ill.
General Electric Co., Lamp Div., Cleveland, O.
Hanovia Chemical & Mfg. Co., Newark, N. J.
Lustra Corp. of America, Brooklyn, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.

LEAD PIPE

See Pipe and Tubing, Lead and Lead Alloy

LEAD SHEETS

See Sheets, Lead

LEAD TUBING

See Pipe and Tubing, Lead and Lead Alloy

LEAK DETECTORS

See Detectors, Leak, Refrigerant

LEATHER BELTING

See Belting, Flat, Leather

LEATHER PACKING

See Packing, Leather

LIGHTS, PILOT AND SIGNAL

Benjamin Electric Mfg. Co., Des Plaines, Ill.
Cooper Co., Clark, Palmyra, N. J.
Dial Light Co. of America, Inc., Brooklyn, N. Y.
General Electric Co., Lamp Div., Cleveland, O.
Hart Mfg. Co., The, Hartford, Conn.
Pyle-National Co., The, Chicago, Ill.
Signal Indicator Co., Brooklyn, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.

LINKS, FUSIBLE

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Grinnell Co., Inc., Providence, R. I.
Morse-Smith-Morse, Inc., Watertown, Mass.
Preferred Utilities Mfg. Corp., New York, N. Y.

LIQUID LEVEL GAGES

See Gages, Liquid Level

LIQUID LEVEL INDICATORS

See Indicators, Liquid Level

LIQUID LEVEL RECORDERS

See Recorders, Liquid Level

LIQUID LEVEL REGULATORS

See Regulators, Liquid Level

LIQUID PRESSURE REGULATORS

See Regulators, Pressure, Liquid

LOCATORS, PIPE, UNDERGROUND

Fisher Research Laboratory, Inc., Palo Alto, Calif.
Globe Phone Mfg. Co., Reading, Mass.
Radioactive Products Inc., Detroit, Mich.
Wilkinson Products Co., Pasadena, Calif.

LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

LOCK NUTS

See Nuts, Lock

LOUVERS AND SHUTTERS, AUTOMATICALLY OR MANUALLY CONTROLLED

Air Conditioning Products Co., Detroit, Mich.
Air Control Products, Inc., Coopersville, Mich.
Air & Refrigeration Corp., New York, N. Y.
Airmaster Corp., Chicago, Ill.
Allen Ventilator Div., Production Planning Co., Rochester, Mich.
American Coolair Corp., Jacksonville, Fla.
American Foundry & Furnace Co., Bloomington, Ill.
American Steel Band Co., Pittsburgh, Pa.
American Warming & Ventilating Co., Toledo, O.
Ammerman Co., C. E., Minneapolis, Minn.
Arex Co., Chicago, Ill.
Barber-Colman Co., Rockford, Ill.
Barnes Co., A. D., Dayton, O.
Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Bern's Mfg. Corp., Chicago, Ill.
Biersach & Niedermeyer Co., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Burt Mfg. Co., Akron, O.
Champion Blower & Forge Co., Lancaster, Pa.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Commercialaire, Inc., Brooklyn, N. Y.
Conoflow Corp., Philadelphia, Pa.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., Decatur, Ala.
Dual-Air Fan Co., South Elgin, Ill.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Elgo Shutter & Mfg. Co., Detroit, Mich.
Empire Ventilation Equipment Co., Long Island City, N. Y. (stationary)
General Blower Co., Morton Grove, Ill.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Jamieson Mfg. Co., Dallas, Tex.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
Kane Mfg. Corp., Kane, Pa.
King Co., The, Owatonna, Minn.
Krauser Boyd, Inc., North Tonawanda, N. Y.
Lockjoint Wood Products Co., Wichita, Kans. (Wood; stationary door, wall, window and ceiling)
Martin Fan & Blower Co., Chicago, Ill.
Maysteel Products, Inc., Milwaukee, Wis.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Myers Electric Co., Inc., Pittsburgh, Pa.
Nelson, Herman, Products, American Air Filter Co., Inc., Louisville, Ky.
Peerless Electric Co., Warren, O.
Reed Unit-Fans, Inc., New Orleans, La.
Register & Grille Mfg. Co., Brooklyn, N. Y.
Riggin Metal Products, Inc., Kankakee, Ill.
Robbins & Myers, Inc., Fan Div., Memphis, Tenn.
Robertson Co., H. H., Pittsburgh, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Signal Electric Mfg. Co., Menominee, Mich.
Sioux Steel Co., Sioux Falls, S. D.
Standard Stamping & Perforating Co., Chicago, Ill.
Swartwout Co., The, Cleveland, O.
Tuttle & Bailey, Inc., New Britain, Conn.
United States Gypsum Co., Chicago, Ill.
United States Register Co., Battle Creek, Mich.
Uno Ventilator Co., Malden, Mass.
Utility Appliance Corp., Los Angeles, Calif.
Van Noorden Co., E., Boston, Mass.
White & Sons, Inc., Wilfrid O., Boston, Mass.
Wing Mfg. Co., L. J., Linden, N. J.

LOW WATER CUT-OFFS

See Cut-offs, Low Water, Heating Boiler

MACHINES, BALANCING

See Equipment, Balancing

MACHINES, BLUE PRINT AND WHITE PRINT

For Reproducing Engineering Drawings

American Photocopy Equipment Co., Chicago, Ill.
Bruning Co., Inc., Charles, Chicago, Ill.
Dietzgen Co., Eugene, Chicago, Ill.
Ozalid Div. of General Aniline & Film Corp., Johnson City, N. Y.
Paragon-Revolute Corp., Rochester, N. Y.
Pease Co., C. F., The, Chicago, Ill.
Peck & Harvey, Chicago, Ill.

MACHINES AND FILM, X-RAY

du Pont de Nemours & Co., E. I., Photo Products Dept., Wilmington, Del.
Eastman Kodak Co., Rochester, N. Y.
Kelley Koett Mfg. Co., The, Covington, Ky.
North American Philips Co., Inc., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.

MACHINES, FLANGING, PIPE AND TUBE

Robinson Corp., Roselle Park, N. J.

MACHINES, FLARING, PIPE AND TUBE

Tri Clover Machine Co., Kenosha, Wis.

MACHINES, PIPE CLEANING

American Wheelabrator & Equipment Corp., Mishawaka, Ind. (for preparation of surface prior to coating)
Continental Machine Co., Chicago, Ill.
Spartan Tool Co., Chicago, Ill.
Wilson, Inc., Thomas C., Long Island City, N. Y.

MACHINES, PIPE CUTTING AND THREADING, PORTABLE

Armstrong Bros. Tool Co., Chicago, Ill.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Gaines-Collins, Quijada Tool Division, Los Angeles, Calif.
Landis Machine Co., Inc., Waynesboro, Pa.
Muncie Gear Wks., Inc., Muncie, Ind.
Obear & Son, W. F., Los Angeles, Calif.
Oster Mfg. Co., Cleveland, O.
Ridge Tool Co., Elyria, O. (Hand)
Thread Ezy Mfg. Co., Corunna, Mich.
Toledo Pipe Threading Machine Co., Toledo, O.

MACHINES, PIPE CUTTING AND THREADING, STATIONARY

Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo
Capewell Mfg. Co., Hartford, Conn.
Gaines-Collins, Quijada Tool Division, Los Angeles, Calif
Landis Machine Co., Inc., Waynesboro, Pa.
Obear & Son, W. F., Los Angeles, Calif.
Oster Mfg. Co., Cleveland, O.
Saunders Machine & Tool Corp., Yonkers, N. Y.
Stratford Pipe Scalloper Machine Co., Stratford, Conn.
Toledo Pipe Threading Machine Co., Toledo, O.

MACHINES, PITTSBURGH LOCK FORMING

Lockformer Co., Chicago, Ill.
Maplewood Machinery Co., Inc., Chicago, Ill.

MACHINES, REFRIGERATION, ABSORPTION

Carrier Corp., Syracuse, N. Y.
Servel, Inc., Evansville, Ind.
Vilter Mfg. Co., The, Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

MACHINES, SLIP ROLL FORMING

Barth Mfg. Co., Milldale, Conn.
Hendley & Whittmore Co., Beloit, Wis.
Kling Bros. Engineering Wks., Chicago, Ill.
Milton Equipment Co., Philadelphia, Pa.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
San Angelo Foundry & Machine Co., San Angelo, Tex.
Webb Corp., The, Webb City, Mo.
Wysong & Miles, Greensboro, N. C.

MACHINES, TESTING, WELD

Air Reduction Sales Co., New York, N. Y.
Dillon Co., Inc., W. C., Van Nuys, Calif.
Olsen Testing Machine Co., Tinius, Willow Grove, Pa.

MAGNESIUM ALLOY SHEETS

See Sheets, Magnesium Alloy

MAGNESIUM TUBING

See Tubing, Magnesium

MALLEABLE UNIONS

See Unions, Malleable

MANIFOLDS AND HEADERS, PREFABRICATED, FOR HEATING SYSTEMS

Copper Boiler & Heater Wks., Manitowoc, Wis.
Grinnell Co., Inc., Providence, R. I.
Milwaukee Valve Co., Milwaukee, Wis.

MANIFOLDS, REFRIGERATION

Frick Co., Waynesboro, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y.
Superior Valve and Fittings Co., Pittsburgh, Pa.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
York Corp., York, Pa.

MANOMETERS

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Co., Chas. M., San Francisco, Calif.
Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence Inc., Div. of Builders Iron Foundry, Providence R. I.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Hastings Instrument Co., Inc., Hampton, Va.
Hill, E. Vernon & Co., Chicago, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
King Engineering Corp., Ann Arbor, Mich.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia Pa.
Norwalk Valve Co., South Norwalk, Conn.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Refinite Corp., Omaha, Neb.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Trimount Instrument Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Wallace & Tiernan Co., Inc., Newark, N. J.
Will Corp., Rochester, N. Y.

MARKERS, PIPE, HOLE AND SADDLE

Jewel Mfg. Co., St. Paul, Minn.

MECHANICAL DRIVE TURBINES

See Turbines, Mechanical Drive

MECHANICAL SPEED CHANGERS

See Changers, Speed, Mechanical

MECHANICAL TRAPS

See Traps, Steam, Mechanical

MERCURY SWITCHES

See Switches, Mercury

METAL HOSE

See Hose, Metal and Fittings

METAL, POROUS, FOR FILTRATION, SEPARATION, DIFFUSION AND FLOW CONTROL

Keystone Carbon Co., Inc., St. Marys, Pa.
Moraine Products Div., General Motors Corp., Dayton, O.
Wabash Mfg. Co., Chicago, Ill.

METALLIC BELLOWS

See Bellows, Thermostatic and Metallic

METALLIC PACKING

See Packing, Metallic

METERS, AIR VELOCITY, DIRECT READING

Air Devices, Inc., New York, N. Y.
Anemostat Corp. of America, New York, N. Y.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Hastings Instrument Co., Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.

METERS, BTU, FOR MEASURING FLOW AND TEMPERATURE AND CALIBRATED IN BTU OR THERMS

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.

METERS, CONDENSATION

American District Steam Co., Inc., North Tonawanda, N. Y.
Buffalo Meter Co., Buffalo, N. Y.
Central Station Steam Co., Detroit, Mich.
Neptune Meter Co., New York, N. Y.

METERS, FLOW, GAS OR AIR

Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hastings Instrument Co., Inc., Hampton, Va.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.

METERS, FLOW, REFRIGERANT

Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hays Corp., Michigan City, Ind.
Moore Products Co., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Schutte & Koerting Co., Cornwells Heights, Bucks County, Pa.
Trimount Instrument Co., Chicago, Ill.
United States Gauge, Div. of American Machine and Metals, Inc., Sellersville, Pa.

METERS, FLOW, STEAM

American Meter Co., Inc., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Instrument Div., Philadelphia Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.

METERS, PROCESS LIQUID

American Meter Co., Inc., New York, N. Y.
Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Bowser, Inc., Fort Wayne, Ind.
Bristol Co., The, Waterbury, Conn.
Buffalo Meter Co., Buffalo, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia.
Moore Products Co., Philadelphia, Pa.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
Worthington-Gamon Meter Co., Newark, N. J.

METERS, VOLUME, AIR AND GAS

American Meter Co., Inc., New York, N. Y.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Hastings Instrument Co., Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Meriam Instrument Co., The, Cleveland, O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Roots-Connersville Blower Div., Connersville, Ind.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Selas Corp. of America, Philadephia, Pa.
Taylor Instrument Companies, Rochester, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.

METERS, WATER

American Moistening Co., Providence, R. I.
Bailey Meter Co., Cleveland, O.
Buffalo Meter Co., Buffalo, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence. R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Hersey Mfg. Co., South Boston, Mass.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
National Meter Co., Brooklyn, N. Y.
Neptune Meter Co., New York, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Pfening Co., Fred D., Columbus, O. (batch measuring)
Republic Flow Meters Co., Chicago, Ill.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Union Water Meter Co., Worcester, Mass.
Worthington-Gamon Meter Co., Newark, N. J.

MIXING VALVES

See Valves, Mixing, Steam and Water

MODULATING VALVES

See Valves, Radiator, Steam and Hot Water Modulating

MOTOR BASES

See Bases and Pads, Vibration Isolating; Bases, Motor Tension Adjusting

MOTOR CONTROLLERS

See Controllers and Starters, Motor

MOTOR OPERATED VALVES

See Valves, Motor Operated

MOTOR STARTERS

See Controllers and Starters, Motor

MOTORS, COMPRESSED AIR POWERED

Chicago Pneumatic Tool Co., New York, N. Y.
Detroit Hoist & Machine Co., Detroit, Mich.
Gardner Denver Co., Quincy, Ill.
Ingersoll-Rand Co., New York, N. Y.
Joy Mfg. Co., Pittsburgh, Pa.
Leiman Bros., Inc., Newark, N. J.

MOTORS, ELECTRIC, FRACTIONAL HP

Abart Gear & Machine Co., Chicago, Ill.
Acro Mfg. Co., The, Columbus, O.
Alliance Mfg. Co., Alliance, O. (Shaded pole)
Baldor Electric Co., St. Louis, Mo.
Barber-Colman Co., Rockford, Ill.
Belgian Electric Sales Corp., New York, N. Y.
Bodine Electric Co., Chicago, Ill.
Brown Brockmeyer Co., Inc., Dayton, O.
Burke Electric Co., Div. of Marathon Electric Mfg. Corp., Erie, Pa.
Century Electric Co., St. Louis, Mo.
Crise Mfg. Co., The, Columbus, O.
Dayton Electric Mfg. Co., Chicago, Ill.
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Somerville, N. J.
Doerr Electric Corp., Cedarburg, Wis.

Eastern Air Devices, Inc., Brooklyn, N. Y.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Electric Motor Corp., Div. of Howard Industries, Inc., Racine, Wis
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fasco Industries, Inc., Rochester, N. Y.
Fairbanks, Morse & Co., Chicago, Ill.
Franklin Electric Co., Inc., Bluffton, Ind.
General Die and Stamping Co., New York, N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hansen Mfg. Co., Inc., Princeton, Ind.
Hoover Co., Kingston-Conley Div., North Plainfield, N. J.
Howell Electric Motors Co., Howell, Mich.
Jack & Heintz, Inc., Cleveland, O.
Kraus Co., Walter S., Woodside, L. I., N. Y.
Lamb Electric Co., Kent, O.
Leland Electric Co., The, Div. of American Machine & Foundry Co., Dayton, O.
Lima Electric Motor Co., The, Lima, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Marco Industries, Inc., Depew, N. Y.
Master Electric Co., Dayton, O.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moore Co., The, Marceline, Mo. (Slow speed fan motors)
Ohio Electric Mfg. Co., Cleveland, O.
Peerless Electric Co., Warren, O.
Portable Electric Tools, Inc., Chicago, Ill.
Redmond Co., Inc., Owosso, Mich.
Reynolds Electric Co., River Grove, Ill.
Ripley Co., Inc., Middletown, Conn.
Robbins & Myers, Inc., Springfield, O.
Rotor Corp., Miamisburg, O.
Royal Mfg. Corp., Waterloo, Ind.
Reuland Electric Co., Alhambra, Calif.
Signal Electric Mfg. Co., Menominee, Mich.
Small Motors Inc., Chicago, Ill.
Smith Corp., A. O., Eastern Motor Div., Dayton, O.
Smith Corp., A. O., Milwaukee, Wis.
Speedway Mfg. Co., Chicago (Cicero), Ill.
Sutton Corp., O. A., The, Wichita, Kan.
Torq Electric Mfg. Corp., Bedford, O.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric Corp., Pittsburgh, Pa.

MOTORS, ELECTRIC, 1 HP AND OVER

Abart Gear & Machine Co., Chicago, Ill.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Allis Co., Louis, The, Milwaukee, Wis.
Baldor Electric Co., St. Louis, Mo.
Belgian Electric Sales Corp., New York, N. Y.
Brown-Brockmeyer Co., Inc., Dayton, O.
Burke Electric Co., Div. of Marathon Electric Mfg. Corp., Erie, Pa
Byron Jackson Co., Los Angeles, Calif. (submersible)
Century Electric Co., St. Louis, Mo.
Continental Electric Co., Inc., Newark, N. J.
Crocker-Wheeler Div., Elliott Co., Ampere, N. J.
Delco Products Div., General Motors Corp., Dayton, O.
Diehl Mfg. Co., Somerville, N. J.
Doerr Electric Corp., Cedarburg, Wis.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Electro Dynamic, Div. of the Electric Boat Co., Bayonne, N. J
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Fairbanks, Morse & Co., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hertner Electric Co., The, Cleveland, O.
Homease Products Division, Paterson, N. J.
Hoover Co., Kingston-Conley Div., North Plainfield, N. J.
Howell Electric Motors Co., Howell, Mich.
Ideal Electric & Mfg. Co., Mansfield, O.
Imperial Electric Co., Akron, O.
Kraus Co., Walter S., Woodside, L. I., N. Y.
Leland Electric Co., The, Div. of American Machine & Foundry Co., Dayton, O.
Lima Electric Motor Co., The, Lima, O.
Marathon Electric Mfg. Corp., Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Master Electric Co., Dayton, O.
Moore Co., The, Marceline, Mo. (Slow speed fan motors)
Peerless Electric Co., Warren, O.
Reliance Electric & Engineering Co., Cleveland, O.
Reuland Electric Co., Alhambra, Calif.
Robbins & Myers, Inc., Springfield, O.
Smith Corp., A. O., Eastern Motor Div., Dayton, O.
Smith Corp., A. O., Milwaukee, Wis.
Star-Kimble Motor Div., Miehle Prntg. Press & Mfg. Co., Bloomfield, N. J.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Wagner Electric Corp., St. Louis, Mo.
Westinghouse Electric Corp., Pittsburgh, Pa.

MOUNTINGS, VIBRATION

See Bases and Pads, Vibration Isolating

MUFFLERS, HOT GAS, FOR REFRIGERANT LINES

Armstrong Co., Richard M., West Chester, Pa.
Industrial Acoustics Co., New York, N. Y.

MUSHROOM VENTILATORS

See Ventilators, Mushroom

NEUTRALIZERS, ACID

See Dehydrant and Acid Neutralizer

NEUTRALIZERS, ODOR

See Adsorbers, Odor

NICKEL AND NICKEL ALLOY PIPE AND FITTINGS

See Tubing, Nickel and Alloy; Fittings, Pipe, Nickel and Nickel Alloy; Pipe, Nickel and Nickel Alloy

NICKEL AND NICKEL ALLOY SHEETS

See Sheets, Nickel and Nickel Alloy

NIPPLES, PIPE, BRASS AND COPPER

Acheson Mfg. Co., Rankin, Pa.
Allen Mfg. Co., W. D., Chicago, Ill.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Nipple Mfg. Co., Cicero, Ill.
Columbus Mfg. & Supply Co., Columbus, O.
Couplings Co., Chicago, Ill.
Crane Co., Chicago, Ill.
G & H Mfg. Co., Philadelphia, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Keeney Mfg. Co., Newington, Conn.
Mueller Brass Co., Port Huron, Mich.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa
Pittsburgh Nipple Wks., Inc., Pittsburgh, Pa.
Sawhill Mfg. Co., Sharon, Pa.
Star Tubular Products Co., Chicago, Ill.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Ware Coupling & Nipple Co., Ware, Mass.
Weatherhead Co., Cleveland, O.

NIPPLES, PIPE, FLEXIBLE

Davis Engineering Corp., Elizabeth, N. J.
Lindy Heaters, Inc., New York, N. Y.
Techniflex Corp., Port Jervis, N. Y.

NIPPLES, PIPE, IRON AND STEEL

Allen Mfg. Co., W. D., Chicago, Ill.
Byers Co., A. M., Pittsburgh, Pa. (Wrought iron)
Chicago Nipple Mfg. Co., Cicero, Ill.
Clow & Sons, James B., Chicago, Ill.
Columbus Mfg. & Supply Co., Columbus, O.
Crane Co., Chicago, Ill.
Flori Pipe Co., The, St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Illinois Malleable Iron Co., Chicago, Ill.
Larkin Packer Co., St. Louis, Mo.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Penn Mfg. Corp. of Washington, Pa., Washington, Pa.
Pittsburgh Nipple Wks., Inc., Pittsburgh, Pa.
Sawhill Mfg. Co., Sharon, Pa.
Star Tubular Products Co., Chicago, Ill.
Union Malleable Mfg. Co., Ashland, O.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Ware Coupling & Nipple Co., Ware, Mass.
Wheeling Machine Products Co., Wheeling, W. Va.

NIPPLES, PIPE, NICKEL AND NICKEL ALLOY

Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Electric Steel Foundry Co., Portland, Ore.
Flori Pipe Co., The, St. Louis, Mo.
Tri-Clover Machine Co., Kenosha, Wis.

NIPPLES, RADIATOR, SLIP AND SCREW

Plumb Mfg. Co., Utica, N. Y.

NOISE ELIMINATION FOR COOLING TOWERS

Industrial Acoustics Co., New York, N. Y.
Industrial Sound Control, Inc., Hartford, Conn.

NOISE ELIMINATORS

See Bases and Pads, Vibration Isolating; Hose, Metal and Fittings; Insulation, Sound Deadening

NOZZLES, ATOMIZING

American Moistening Co., Providence, R. I.
Bahnson Co., Winston-Salem, N. C.
Benjamin Air Rifle Co., St. Louis, Mo.
Bete Fog Nozzle Inc., Greenfield, Mass.
Binks Mfg. Co., Chicago, Ill.
Boston Machine Works Co., Lynn, Mass.
Delavan Mfg. Co., Des Moines, Ia.
Eddington Metal Specialty Co., Eddington, Pa.
Electric Sprayit Co., The, Sheboygan, Wis.
Marley Co., Inc., The, Kansas City, Kans.
Martocello & Co., Jos. A., Philadelphia, Pa.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Co., Bellwood, Ill.
Supreme Electric Products Corp., Rochester, N. Y.
Water Cooling Corp., New York, N. Y.

NOZZLES, FLOODING

Eddington Metal Specialty Co., Eddington, Pa.
Marley Co., Inc., The, Kansas City, Kans.
Spraying Systems Co., Bellwood, Ill.
Water Cooling Corp., New York, N. Y.

NOZZLES, FLOW MEASURING

Bailey Meter Co., Cleveland, O.
Delavan Mfg. Co., Des Moines, Ia.
Foxboro Mfg. Co., Foxboro, Mass.
Penn Industrial Instrument Corp., Philadelphia, Pa.

NOZZLES, SPARGER, FOR TANK HEATING

Heil Process Equipment Corp., Cleveland, O.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.

NOZZLES, SPRAY

American Cooling Tower Co., Kansas City, Mo.
American Moistening Co., Providence, R. I.
April Showers Co., Inc., Washington, D. C.
Bahnson Co., Winston-Salem, N. C.
Balloffet Dies & Nozzle Co., Inc., Guttenberg, N. J.
Bayley Blower Co., Milwaukee, Wis.
Benjamin Air Rifle Co., St. Louis, Mo.
Bete Fog Nozzle Inc., Greenfield, Mass.
Binks Mfg. Co., Chicago, Ill.
Black Mfg. Co., The, Parkton, Md.
Blower Application Co., Milwaukee, Wis.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Chain Belt Co., Milwaukee, Wis.
Clarage Fan Co., Kalamazoo, Mich.
Delavan Mfg. Co., Des Moines, Ia.
Dustlix Corp., Milwaukee, Wis.
Eclipse Air Brush Co., Inc., Newark, N. J.
Eddington Metal Specialty Co., Eddington, Pa.
Electric Sprayit Co., The, Sheboygan, Wis.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Grinnell Co., Inc., Providence, R. I.
Harry Cooling Towers, Inc., New York, N. Y.
Leinweber Aluminum Nozzles, Chicago, Ill.
Link-Belt Co., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
Marley Co., Inc., The, Kansas City, Mo.
Martocello & Co., Jos. A., Philadelphia, Pa.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Parks-Cramer Co., Fitchburg, Mass.
Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.
Plummer Spray Equipment Co., Napoleon, O.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Rega Mfg. Co., Rochester, N. Y.
Rockwood Sprinkler Co., Worcester, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Skinner Irrigation Co., Troy, O.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Co., Bellwood, Ill.
Steinen Mfg. Co., Wm., Newark, N. J.
Supreme Electric Products Corp., Rochester, N. Y.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Co., St. Louis, Mo.
Yarnall-Waring Co., Philadelphia, Pa.

NUTS, LOCK

Chase Brass & Copper Co., Waterbury, Conn.
Crane Co., Chicago, Ill.
Elastic Stop Nut Corp. of America, Union, N. J.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
Grinnell Co., Inc., Providence, R. I.
Grip Nut Co., Chicago, Ill.
Industrial Screw Co., Chicago, Ill.
Kwikon Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
Locknut Corp. of America, Chicago, Ill.
MacLean-Fogg Lock Nut Co., Chicago, Ill.
Palnut Co., Irvington, N. J.
Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
SKF Industries, Inc., Philadelphia, Pa.
Shakeproof, Inc., Chicago, Ill. (Lock washers)
Standard Pressed Steel Co., Jenkintown, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Swallow Airplane Co., Wichita, Kan.
Tinnerman Products, Inc., Cleveland, O.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

OBSERVATION BOILER PORTS

See Ports, Observation, Boiler

ODOR ADSORBERS

See Filters, Air; Adsorbers, Odor

ODOR NEUTRALIZERS

See Adsorbers, Odor; Compounds, Air Freshening

OIL BURNERS

See Burners, Oil

OIL COOLERS

See Coolers, Oil

OIL, HEAT TRANSFER

Shell Oil Co., Lubricants Dept., New York, N. Y.
Socony-Vacuum Oil Co., Inc., New York, N. Y.

OIL, REFRIGERATION

Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Frick Co., Waynesboro, Pa.
Gulf Oil Corp., Pittsburgh, Pa.
Houghton & Co., E. F., Philadelphia, Pa.
Illinois Oil Products, Inc., Rock Island, Ill.
Shell Oil Co., Lubricants Dept., New York, N. Y.
Socony-Vacuum Oil Co., Inc., New York, N. Y.
Standard Oil Co. of California, Los Angeles, Calif.
Standard Oil Co. of Indiana, Chicago, Ill.
Sun Oil Co., Philadelphia, Pa.
Texas Co., The, New York, N. Y.
York Corp., York, Pa.

OIL SEPARATORS

See Separators, Steam and Oil

OPERATORS, DAMPER, DUCT

A-P Controls Corp., Milwaukee, Wis.
Acro Mfg. Co., The, Columbus, O.
Arens Controls, Inc., Evanston, Ill.
Autempco Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Foxboro Co., Foxboro, Mass.
General Controls Co., Glendale, Calif.
Hagan Corp., Pittsburgh, Pa.
Hart & Cooley Mfg. Co., Holland, Mich.
Johnson Service Co., Milwaukee, Wis.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
Sampsel Time Control, Inc., Spring Valley, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Instruments, Div., Weston Electrical Instrument Corp., Newark, N. J.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Young Regulator Co., Cleveland, O.

OPERATORS, VALVE

Autempco Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Babbitt Steam Specialty Co., New Bedford, Mass.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.

Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Foxboro Co., Foxboro, Mass.
General Controls Co., Glendale, Calif.
Grove Regulator Co., Oakland, Calif.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Johnson Service Co., Milwaukee, Wis.
Kieley & Mueller, Inc., North Bergen, N. J.
Ledeen Mfg. Co., Los Angeles, Calif.
Mason-Neilan Regulator Co., Boston, Mass.
McDonnell & Miller, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Perfex Corp., Milwaukee, Wis.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.

ORIFICE FLANGES

See Flanges, Orifice

ORIFICE UNIONS

See Unions, Orifice

ORIFICES, FLOW MEASURING

Bailey Meter Co., Cleveland, O.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Trimount Instrument Co., Chicago, Ill.

ORIFICES, RADIATOR

Autempco Corp., New York, N. Y.
Barnes & Jones, Inc., Boston, Mass.
Cashin Co., W. D., Boston, Mass.
Grinnell Co., Inc., Providence, R. I.
Illinois Engineering Co., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Tallmadge, Webster, Systems, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Thrush & Co., H. A., Peru, Ind.
Webster & Co., Warren, Camden, N. J.

OVERFIRE AIR JETS

See Jets, Overfire Air, for Smoke Abatement

OVER-PRESSURE UNLOADERS, FOR REFRIGERANTS

Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Henry Valve Co., Melrose Park, Ill.

OXYGEN PIPING AND REGULATING SYSTEMS

Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Oxygen Equipment & Service Co., Chicago, Ill.

OZONE APPARATUS

General Ozone Corp., Chicago, Ill.
Montgomery Bros., San Francisco, Calif.
Norwood Associated Engineers Inc., Springfield, Mass.
Ozone Air Co., Grand Rapids, Mich.
United States Ozone Co. of America, Scottdale, Pa.
Welsbach Corp., The, Ozone Processes Div., Philadelphia, Pa.

PACKAGED HEAT PUMP UNITS

See Unit, Air Conditioning, Reverse Refrigeration Cycle

PACKAGED STEAM GENERATORS

See Boilers, Steam Generating Units, Heating and Process

PACKING, ASBESTOS

Acme Asbestos Covering & Flooring Co., Chicago, Ill.
Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chesterton Co., A. W., Everett, Mass.
Chicago Gasket Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Durabla Mfg. Co., New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felt Products Mfg. Co., Chicago, Ill.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Gatke Corp., Chicago, Ill.
Goodyear Tire & Rubber Co., Akron, O.
Grant Wilson Inc., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J.
New York Belting & Packing Co., Passaic, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa
Raybestos-Manhattan, Inc., Passaic, N. J.
Sall Mountain Co., Hamilton, O.
Strahman Valves, Inc., New York, N. Y. (Sheet and rod)
Union Asbestos & Rubber Co., Chicago, Ill.
United States Rubber Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PACKING, FIBER

American Felt Co., Glenville, Conn.
Anchor Packing Co., Philadelphia, Pa.
Armstrong Cork Co., Lancaster, Pa.
Belmont Packing & Rubber Co., The, Philadelphia, Pa
Chesterton Co., A. W., Everett, Mass.
Chicago Gasket Co., Chicago, Ill.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Durabla Mfg. Co., New York, N. Y.
Ehret Magnesia Mfg. Co., Valley Forge, Pa
Endura Mfg. Corp., Quakertown, Pa.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A., New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
Metallo Gasket Co., New Brunswick, N. J.
New York Belting & Packing Co., Passaic, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif
Products Research Co., Los Angeles, Calif.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa
Raybestos-Manhattan, Inc., Passaic, N. J.
Union Asbestos & Rubber Co., Chicago, Ill.
United States Rubber Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PACKING, LEATHER

Alexander Bros., Philadelphia, Pa.
Anchor Packing Co., Philadelphia, Pa.
Baldwin Belting, Inc., New York, N. Y.
Belmont Packing & Rubber Co., The, Philadelphia, Pa
Chicago Belting Co., Chicago, Ill.
Chicago Gasket Co., Chicago, Ill.
Davis & Co., Wayne, Westboro, Mass.
Excelsior Leather Washer Mfg. Co., Rockford, Ill.
Garlock Packing Co., Palmyra, N. Y.
Graton & Knight Co., Worcester, Mass.
Houghton & Co., E. F., Philadelphia, Pa.
Q-P Mfg. Co., Needham Heights, Mass.
Rhoads & Sons, J. E., Philadelphia, Pa.
Schieren Co., Chas. A., New York, N. Y
Williams & Son, I. B., Dover, N. H.
Zimmerman Packing Co., Cincinnati, O.

PACKING, METALLIC

Abbott & Biddle Co., Philadelphia, Pa.
Allpax Co., Inc., Mamaroneck, N. Y.
Anchor Packing Co., Philadelphia, Pa.
Belmont Packing & Rubber Co., The, Philadelphia, Pa
Chesterton Co., A. W., Everett, Mass.
Chicago Gasket Co., Chicago, Ill.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Felt Products Mfg. Co., Chicago, Ill.
Flexrock Co., Philadelphia, Pa.
France Packing Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Johns-Manville, New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
National Engineering Products Inc., Washington, D. C.
National Lead Co., New York, N. Y.
New York Belting & Packing Co., Passaic, N. J.

Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Strahman Valves, Inc., New York, N. Y. (sheet and rod)
Union Asbestos & Rubber Co., Chicago, Ill.
United States Rubber Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PACKING, RUBBER AND SYNTHETIC

American Felt Co., Glenville, Conn.
Anchor Packing Co., Philadelphia, Pa.
Armstrong Cork Co., Lancaster, Pa.
Belmont Packing & Rubber Co., The, Philadelphia, Pa.
Boston Woven Hose & Rubber Co., Cambridge, Mass.
Chesterton Co., A. W., Everett, Mass.
Chicago Belting Co., Chicago, Ill.
Chicago Gasket Co., Chicago, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Continental Rubber Wks., Erie, Pa.
Crane Packing Co., Chicago, Ill.
Darcoid Co., Inc., New York, N. Y.
Dow Corning Corp., Midland, Mich.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Felt Products Mfg. Co., Chicago, Ill.
Firestone Industrial Products Co., Akron, O.
Flexrock Co., Philadelphia, Pa.
Garlock Packing Co., Palmyra, N. Y.
Gates Rubber Co., Denver, Colo.
General Electric Co., Chemical Dept., Pittsfield, Mass.
Gil-Lair Products, Inc., Pasadena, Calif.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Graton & Knight Co., Worcester, Mass.
Greene, Tweed & Co., North Wales, Pa.
Hamilton Rubber Mfg. Corp., Trenton, N. J.
Houghton & Co., E. F., Philadelphia, Pa.
Johns-Manville, New York, N. Y.
Linear Incorporated, Philadelphia, Pa.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
New York Belting & Packing Co., Passaic, N. J.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Parker Appliance Co., The, Cleveland, O.
Products Research Co., Los Angeles, Calif.
Q-P Mfg. Co., Needham Heights, Mass.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown, O.
Saran Lined Pipe Co., Ferndale, Mich.
Thermoid Co., Trenton, N. J.
United States Gasket Co., Camden, N. J.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Zimmerman Packing Co., Cincinnati, O.

PAINT, HIGH TEMPERATURE, FOR HOT SURFACES

Baer Bros., New York, N. Y.
Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Chemical Solvent Co., Birmingham, Ala.
Claronex Products, Inc., Brooklyn, N. Y.
Continental Products Co., Euclid, O.
Debevoise Co., The, Brooklyn, N. Y.
Foster Co., Benjamin, Philadelphia, Pa.
Hetzel Roofing Products Co., Newark, N. J.
Illinois Bronze Powder Co., Chicago, Ill.
Koppers Company, Inc., Pittsburgh, Pa.
Midland Paint & Varnish Co., Cleveland, O.
National Lead Co., New York, N. Y.
O'Brien Corp., The, South Bend, Ind.
Steelcote Mfg. Co., St. Louis, Mo.
Tropical Paint & Oil Co., Cleveland, O.
Truscon Laboratories, Detroit, Mich.
United Chromium, Inc., New York, N. Y.
Warren Refining & Chemical Co., The, Cleveland, O.
Wilbur & Williams Co., Brighton, Mass.

PANEL BOARDS

See Boards, Panel and Control

PANEL HEATING AND COOLING

See Coils and Panels, Radiant Heating and Cooling; Conductors and Panels, Electrical, for Radiant Heating

PANELS, PERFORATED, FOR AIR DIFFUSION

Multi-Vent Div., Pyle-National Co., The, Chicago, Ill.
Simplex Ceiling Corp., New York, N. Y.

PARTS FOR HEATING AND AIR CONDITIONING EQUIPMENT

Ackermann Mfg. Co., Wheeling, W. Va.
Adams Co., The, Dubuque, Iowa
Air & Refrigeration Corp., New York, N. Y. (insulated panels)
Atlas Mfg. Co., St. Paul, Minn. (cabinets for unit air conditioners & boilers)
Berger Mfg. Div., Republic Steel Corp., Canton, O. (cabinets, housings, canopies)
Camloc Fastener Corp., New York, N. Y. (Fasteners for access panels and sheet metal)
Carey Mfg. Co., Philip, Lockland, Cincinnati, O. (Insulating panel for housing and duct construction)
Cincinnati Metalcrafts Inc., Cincinnati, O. (sheet metal fabricating)
Commercial Shearing & Stamping Co., Youngstown, O.
Detroit Stamping Co., Detroit, Mich.
Dover Metal Products Co., The, Canal Fulton, O.
Duro-Dyne Corp., Hempstead, N. Y. (hardware and parts used in fabricating dampers and turning vanes)
Dzus Fastener Co., Inc., Babylon, N. Y. (quick acting quarter turn fasteners for access doors, inspection panels, etc.)
Falstrom Co., Passaic, N. J. (Air conditioning cabinets, steel control panels)
Lindsay Structure, Inc., Skokie, Ill. (Cabinet construction for air conditioning and warm air heating equipment)
Metalcraft Inc., Mason City, Ia. (nameplates for equipment)
Mueller Brass Co., Port Huron, Mich. (Specially fabricated copper tubing, machine formed tubes)
Pittsfield Products, Inc., Ann Arbor, Mich. (perforated metal parts)
South Chester Co., Southco Div., Lester, Pa. (blind rivets, panel fasteners, adjustable pawl fasteners, door retaining springs)
Speakman Co., Wilmington, Del. (machined parts)
Rigidized Metals Corp., Buffalo, N. Y.

PENETRANT, DYE, FOR NON-DESTRUCTIVE TESTING OF METAL

Dy-Check Co., Div. of Northrop Aircraft, Inc., Hawthorne, Calif.

pH INDICATORS

See Indicators, pH

PILLOW BLOCK BEARINGS

See Bearings, Pillow Block

PILOT LIGHTS

See Lights, Pilot and Signal

PIPE, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
Colonial Alloy Co., Metals Div., Philadelphia, Pa.
Revere Copper & Brass, Inc., New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Viking Copper Tube Co., Cleveland, O.

PIPE, ASBESTOS FIBER AND CEMENT

Johns-Manville, New York, N. Y.
Keasbey & Mattison Co., Ambler, Pa.

PIPE BENDERS

See Benders, Pipe

PIPE, BRASS AND COPPER

American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Hussey & Co., C. G., Div. Copper Range Co., Pittsburgh, Pa.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Phelps Dodge Copper Products Corp., British American Tube Div., New York, N. Y.
Reading Tube Corp., Long Island City, N. Y.
Revere Copper and Brass, Incorporated, New York, N. Y.
Viking Copper Tube Co., Cleveland, O.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich.

PIPE, CAST IRON, PRESSURE, BELL AND SPIGOT

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Central Foundry Co., Newark, N. J.
Clow & Sons, James B., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
United States Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE, CAST IRON, PRESSURE, FLANGED

Alabama Pipe Co., Anniston, Ala.
American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Inner-Tite Div. of Yara Engineering Corp., Elizabeth, N. J.
Lynchburg Foundry Co., Lynchburg, Va.
McWane Cast Iron Pipe Co., Birmingham, Ala.
United States Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE, CAST IRON, THREADED

American Cast Iron Pipe Co., Birmingham, Ala.
Clow & Sons, James B., Chicago, Ill.

McWane Cast Iron Pipe Co., Birmingham, Ala.
Somerville Iron Wks., Somerville, N. J.
United States Pipe & Foundry Co., Burlington, N. J.
Warren Foundry & Pipe Corp., New York, N. Y.

PIPE CLEANING COMPOUNDS

See Compounds, Cleaning, Pipe Coil and Condenser

PIPE COILS

See Coils, Pipe

PIPE COUPLINGS

See Couplings, Pipe

PIPE COVERING, ADHESIVES

See Adhesives, for Pipe Covering

PIPE CUTTERS

See Cutters

PIPE CUTTING MACHINES

See Machines, Pipe Cutting and Threading

PIPE EXTRACTORS

See Extractors, Pipe

PIPE, FIBER

Brown Co., Boston, Mass.
Orangeburg Mfg. Co., Orangeburg, N. Y.
United States Plywood Corp., New York, N. Y.

PIPE AND FITTINGS, GAS VENT AND FLUE

Adelta Mfg. Co., Inc., Philadelphia, Pa.
Char Gale Mfg. Co., Minneapolis, Minn.
Condensation Engineering Corp., Chicago, Ill.
Corbman Bros., Inc., Philadelphia, Pa.
Enderle, Inc., Ltd., Frank X., Los Angeles, Calif.
Excelsior Steel Furnace Co., The, Chicago, Ill.
Heremetal Co., Minneapolis, Minn.
Johns-Manville, New York, N. Y.
Van-Packer Corp., Chicago, Ill.
Wallace Co., William, Metalbestos Div., Belmont, Calif.

PIPE FITTINGS

See Fittings, Pipe

PIPE, GLASS

Corning Glass Wks., Corning, N. Y.
Fischer & Porter Co., Hatboro, Pa.

PIPE HANGERS

See Hangers and Supports, Pipe

PIPE, HARD RUBBER

American Hard Rubber Co., New York, N. Y.
Goodrich Co., B. F., Akron, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Raybestos-Manhattan, Inc., Passaic, N. J.
Stokes Molded Products, Inc., Trenton, N. J.
United States Rubber Co., New York, N. Y.

PIPE INSULATION ADHESIVES

See Adhesives, for Pipe Covering

PIPE, JACKETED

Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Flori Pipe Co., The, St. Louis, Mo.
Fluid Systems, Inc., New Haven, Conn.
Kaiser Co., E. B., Chicago, Ill.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Nooter Corp., St. Louis, Mo.
Parks-Cramer Co., Fitchburg, Mass.
Pittsburgh Pipe Coil & Bending Co., Etna, Pa.
Ric-wiL Co., Cleveland, O.
Roessing Mfg. Co., Pittsburgh, Pa.
Shaw-Kendall Engineering Co., Toledo, O.

PIPE JOINT COMPOUNDS

See Cement and Compounds, Pipe Joint

PIPE LOCATORS

See Locators, Pipe, Underground

PIPE, LINED

American Brass Co., Waterbury, Conn. (Tin)
American Cast Iron Pipe Co., Birmingham, Ala. (Cement)
American Hard Rubber Co., New York, N. Y. (Rubber)
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Bart Mfg. Corp., Belleville, N. J.
Cement Lined Pipe Co., Lynn, Mass. (Cement)
Division Lead Co., Chicago, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Gates Engineering Co., Wilmington, Del.
Goodrich Co., B. F., Akron, O. (Rubber-lined)
Heil Process Equipment Corp., Cleveland, O.
Heresite & Chemical Co., Manitowoc, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa. (Cement)
Kaiser Co., E. B., Chicago, Ill.
Knight, Maurice A., Akron, O.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Michigan Pipe Co., Bay City, Mich. (Wood, saran rubber)
National Lead Co., New York, N. Y. (Lead)
Nooter Corp., St. Louis, Mo.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
Saran Lined Pipe Co., Ferndale, Mich.
United States Rubber Co., New York, N. Y. (Rubber)
United States Stoneware Co., New York, N. Y.
Warren Foundry & Pipe Corp., New York, N. Y.(Cement)
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, NICKEL AND NICKEL ALLOY

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Electric Steel Foundry Co., Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
International Nickel Co., Inc., The, New York, N. Y.
Revere Copper and Brass, Incorporated, New York, N. Y.
Tri-Clover Machine Co., Kenosha, Wis.

PIPE, PLASTIC

Acadia Synthetic Products, Div., Western Felt Works, Chicago, Ill.
American Agile Corp., Cleveland, O.
American Hard Rubber Co., New York, N. Y.
Aqua-Therm, Inc., Dayton, O.
Carlon Products Corp., Cleveland, O.
Commercial Plastics Co., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Extruded Plastics, Inc., Norwalk, Conn.
General Ceramics & Steatite Corp., Keasbey, N. J.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, O.
Irvington Varnish & Insulator Co., Irvington, N. J.
Knight, Maurice A., Akron, O.
Michigan Plastic Pipe Co., Detroit, Mich.
Mills Corp., Elmer E., Chicago, Ill.
New York Belting & Packing Co., Passaic, N. J.
North Penn Co., New York, N. Y.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Plastex Pipe and Extrusion Co., The, Columbus, Ohio
Saran Lined Pipe Co., Ferndale, Mich.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

PIPE, PRE-INSULATED

American Insulated Pipe Co., New York, N. Y.
Durant Insulated Pipe Co., Palo Alto, Calif.
Durant International Corp., Williamstown, N. J.
Flexible Tubing Corp., Guilford, Conn.
Kaiser Co., E. B., Chicago, Ill.
Ric-wiL Co., Cleveland, O.

PIPE REAMERS

See Reamers, Pipe

PIPE REPAIR CLAMPS

See Clamps, Pipe Repair

PIPE, SPIRAL, RIVETED AND WELDED

Armco Drainage & Metal Products, Inc., Middletown, O.
Biggs Boiler Wks., Co., The, E. Akron, O.
Naylor Pipe Co., Chicago, Ill.
Nikoh Tube Co., Chicago, Ill.
Taylor Forge & Pipe Wks., Chicago, Ill.

PIPE, STEEL, ALLOY

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Div., United States Steel Co., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, BUTT AND LAP WELDED

Bethlehem Steel Co., Bethlehem, Pa.
Biggs Boiler Works Co., The, E. Akron, O. (large diameter)

Byers Co., A. M., Pittsburgh, Pa.
Chicago Metal Mfg. Co., Chicago, Ill.
Claymont Steel Corp., Div. of Colorado Fuel & Iron Corp., Claymont, Del.
Electric Steel Foundry Co., Portland, Ore.
Fretz-Moon Tube Co., Butler, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
National Tube Div., United States Steel Co., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y. (Specially fabricated)
South Chester Tube Co., Chester, Pa.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Tippett & Wood, Phillipsburgh, N. J. (12 in. and larger)
Wheatland Steel Products Co., Philadelphia, Pa.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, SEAMLESS

Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Div., United States Steel Co., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Cleveland, O.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Timken Roller Bearing Co., Canton, O.
Youngstown Sheet & Tube Co., Youngstown, O.

PIPE, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Electric Steel Foundry Co:, Portland, Ore.
Globe Steel Tubes Co., Milwaukee, Wis.
Michigan Pipe Co.. Bay City, Mich.
National Tube Div., United States Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel and Tubes Div., Cleveland, O.
Timken Roller Bearing Co., Canton, O.
Trent Tube Co., East Troy, Wis.
Tri-Clover Machine Co., Kenosha, Wis.

PIPE, STONEWARE

General Ceramics & Steatite Corp., Keasbey, N. J.
Knight, Maurice A., Akron, O.
United States Stoneware Co., New York, N. Y.

PIPE SUPPORTS

See Hangers and Supports, Pipe

PIPE, TIN

Alpha Metals, Inc., Brooklyn, N. Y.
Division Lead Co., Chicago, Ill.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Gardiner Metal Co., Chicago, Ill.
National Lead Co., New York, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.

PIPE TONGS

See Tongs, Pipe

PIPE, TUBING, FITTINGS AND VALVES, CARBON AND GRAPHITE

General Ceramics & Steatite Corp., Keasbey, N. J.
National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.

PIPE AND TUBING, LEAD AND LEAD ALLOY

Alpha Metals, Inc., Brooklyn, N. Y.
Division Lead Co., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Works, Inc., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
United States Stoneware Co., New York, N. Y.

PIPE VISES

See Vises, Pipe

PIPE, VITRIFIED CLAY

Bowerston Shale Co., Bowerston, O.
General Ceramics & Steatite Corp., Keasbey, N. J.
Kaul Clay Mfg. Co., The, Toronto, O.
Logan Clay Product Co., The, Logan, O.
Ric-wiL Co., Cleveland, O.
Robinson Clay Product Co., The, Akron, O.
Stillwater Clay Products Co., The, Cleveland, O.
Superior Clay Corp., The, Uhrichsville, O.
Texas Vitrified Products Co., Mineral Wells, Tex.

PIPE, WOOD

Caldwell Co., W. E., Louisville, Ky.
Michigan Pipe Co., Bay City, Mich.
Santa Fe Tank & Tower Co., Los Angeles, Calif.

PIPE WRENCHES

See Wrenches, Pipe

PIPE, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

PIPING, FABRICATED

See Bends, Expansion, Steam Pipe; Headers, Pipe, Welded; Coils, Pipe

PIPING IDENTIFICATON MARKERS

See Identification Markers for Piping Services

PISTON RINGS

See Rings, Piston

PITOT TUBES

See Tubes, Pitot

PITTSBURGH LOCK FORMING MACHINES

See Machines, Pittsburgh Lock Forming

PLASTIC PIPE AND PIPE FITTINGS

See Pipe, Plastic; Fittings, Pipe, Plastic

PLASTIC TUBING

See Tubing, Plastic

PLATES, FLOOR AND CEILING

Beaton & Cadwell Mfg. Co., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Farley Sleeve & Hanger Co., Cleveland, O.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
G & H Mfg. Co., Philadelphia, Pa.
Grinnell Co., Providence, R. I.
Hupp Corp., Globe Stamping Div., Cleveland, O.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Keeney Mfg. Co., Newington, Conn.
Little Mfg. Co., M. S., Hartford, Conn.
Ritter Pattern & Casting Co., Inc., New York, N. Y.
Walworth Co., New York, N. Y.
Zurn Mfg. Co., J. A., Erie, Pa.

PLUG COCKS

See Valves, Plug

PLUG VALVES

See Valves, Plug

PLUGS, FUSIBLE, BOILER

Chicago Specialty Mfg. Co., Chicago, Ill.
Chiksan Co., Brea, Calif.
Eclipse Fuel Engineering Co., Rockford, Ill.
Swift Lubricator Co., Elmira, N. Y.
Walworth Co., New York, N. Y.

PLUGS, REPAIR, FOR TANKS

Adams Pipe Repair Products, El Monte, Calif.
Chicago Specialty Mfg. Co., Chicago, Ill.
Kenney Co., L. C., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Standard Pressed Steel Co., Jenkintown, Pa.
U. S. Plug & Fitting Co., Wellington, O.

PORTS, OBSERVATION, BOILER

Bigelow Liptak Corp., Detroit, Mich.
Chicago Fire Brick Co., Chicago, Ill.
Detroit Stoker Co., Detroit, Mich.

Ess Instrument Co., Bergenfield, N. J.
Green Fire Brick Co., Mexico, Mo.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Reintjes Co., Geo. P., Kansas City, Mo.
Springfield Boiler Co., Springfield, Ill.

POSITIONERS, WELDING

See Welding and Cutting Apparatus, Oxy Acetylene

POWER SHEARS

See Shears, Power

PREHEATERS, FUEL OIL

Alstrom Corp., Bronx, N. Y.
American District Steam Co., Inc., North Tonawanda, N. Y.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Brown Fintube Co., The, Elyria, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper Co., Clark, Palmyra, N. J.
Crotty Mfg. Co., Flushing, L. I., N. Y.
Davis Engineering Corp. Elizabeth, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Downingtown Iron Works, Downingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drying Systems, Inc., Chicago, Ill.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Engineer Co., New York, N. Y.
Falcon Equipment Co., New Brighton, Pa.
Fluid Systems, Inc., New Haven, Conn.
General Fittings Co., Providence, R. I.
General Heaters & Regulators Co., Chicago, Ill.
Griscom-Russell Co., New York, N. Y.
Hauck Mfg. Co., Brooklyn, N. Y.
Hynes Div., Rodman H. Martin Co., Philadelphia, Pa.
Industrial Engineering & Equipment Co., St. Louis, Mo. (Electric)
Johnson Corp., The, Three Rivers, Mich.
Kewanee-Ross Corp., Kewanee, Ill.
Leahy Mfg. Co., Los Angeles, Calif.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Manning & Lewis Engineering Co., Newark, N. J.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Pipe Bending Co., New Haven, Conn.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Peabody Engineering Corp., New York, N. Y.
Preferred Utilities Mfg. Corp., New York, N. Y.
Reliable Products Mfg. Co., Brooklyn, N. Y.
Rempe Co., Chicago, Ill.
Richmond Engineering Co., Inc., Richmond, Va.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Sims Co., Erie, Pa.
Staples & Pfeiffer, San Francisco, Calif.
Superior Combustion Industries, Inc., New York, N. Y.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.
Trent Inc., Philadelphia, Pa.
Vulcan Electric Co., Danvers, Mass.
Whitlock Mfg. Co., Hartford, Conn.
Wiegand Co., Edwin L., Pittsburgh, Pa. (Electric)
Yula Water Heaters Inc., New York, N. Y.

PREHEATERS AND STRESS RELIEVERS, ELECTRIC, FOR PIPE WELDS

Electric Arc, Inc., Newark, N. J.
Falcon Equipment Co., New Brighton, Pa.
Martin-Quaid Co., Philadelphia, Pa.
Trent Inc., Philadelphia, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.

PRE-INSULATED PIPE

See Pipe, Pre-Insulated

PRESSURE BLOWERS

See Blowers, High Pressure

PRESSURE CONTROLLERS

See Regulators, Pressure

PRESSURE GAGES

See Gages, Indicating, Pressure

PRESSURE INDICATOR-CONTROLLERS

See Indicator-Controllers, Pressure

PRESSURE RECORDER-CONTROLLERS

See Recorder-Controllers, Pressure

PRESSURE RECORDERS

See Recorders, Pressure and Vacuum

PRESSURE REDUCING VALVES

See Valves, Pressure Reducing and Regulating

PRESSURE REGULATING VALVES

See Valves, Pressure Reducing and Regulating

PRESSURE REGULATORS

See Regulators, Pressure

PRESSURE SWITCHES

See Switches, Pressure and Vacuum

PROCESS HEATING SYSTEMS

See Systems, Process Heating, High Temperature

PROCESS STEAM SUPERHEATERS

See Superheaters, Process Steam

PROCESS AND STORAGE TANKS

See Tanks, Process and Storage

PROPANE VAPORIZERS

See Vaporizers

PROPELLER FANS

See Fans, Propeller

PROPELLER PUMPS

See Pumps, Propeller

PROPORTIONING PUMPS

See Pumps, Proportioning

PROTECTIVE COATINGS

See Coatings, Protective, for Metal

PROTECTORS, GAGE GLASS

Bache, Semon & Co., New York, N. Y.
Penberthy Injector Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Wright-Austin Co., Detroit, Mich.

PROTECTORS, PIPE COVERING

American District Steam Co., Inc., North Tonawanda, N. Y.
Bigelow-Liptak Corp., Detroit, Mich.
Carpenter & Paterson, Inc., East Boston, Mass.
Childers Mfg. Co., Houston, Tex.
Cinder Products Corp., Providence, R. I.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Grant Wilson Inc., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Reynolds Metals Co., Louisville, Ky.
Ric-wiL Co., Cleveland, O.
Smith Products Co., Detroit, Mich.
Weston Electrical Instrument Corp., Newark, N. J.

PSYCHROMETERS, MOTOR ASPIRATED

Bahnson Co., Winston-Salem, N. C.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Hill, E. Vernon & Co., Chicago, Ill.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Instruments Div., Weston Electrical Instrument Corp. Newark, N. J.

PSYCHROMETERS, SLING AND HAND ASPIRATED

American Moistening Co., Providence, R. I.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
General Scientific Equipment Co., Philadelphia, Pa.
Grinnell Co., Inc., Providence, R. I.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon & Co., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Parks-Cramer Co., Fitchburg, Mass.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Scientific Instrument Co., Detroit, Mich.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

PSYCHROSTATS

See Humidistats

PULLEYS AND SHEAVES, FOR BELT DRIVES

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Browning Mfg. Co., Inc., Maysville, Ky.
Central Die Casting & Mfg. Co., Inc., Chicago, Ill. (V belt)
Chicago Die Casting Mfg. Co., Chicago, Ill. (v-type and flat type)
Climax Metal Products Co., Cleveland, O. (v-belt and variable pitch)
Congress Drives Div., Tann Corp., Detroit, Mich. (V belt—fractional and multiple horsepower)
Dayton Rubber Co., Dayton, O.
Dick Co., Inc., R. & J., Passaic, N. J. (Steel split)
Doall Co., The, Des Plaines, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
Ft. Worth Steel & Machinery Co., Ft. Worth, Texas
Gates Rubber Co., The, Denver, Colo.
Goldens' Foundry & Machine Co., Columbus, Ga. (Cast iron)
Horton Mfg. Co., Minneapolis, Minn. (Variable speed)
Jones Foundry Machine Co., W. A., Chicago, Ill. (flat)
Lau Blower Co., Dayton, O.
Lewellen Mfg. Co., Columbus, Ind.
Lovejoy Flexible Coupling Co., Chicago, Ill.
Maurey Mfg. Corp., Chicago, Ill. (v-belt steel and cast iron)
Medart Co., St. Louis, Mo.
Pyott Foundry & Machine Co., Chicago, Ill.
Scientiae Tool Co., Dayton, O. (variable pitch)
Speed Selector Inc., Cleveland, O. (variable pitch)
Sprout-Waldron & Co., Muncy, Pa.
Thermoid Co., Trenton, N. J.
Utility Appliance Corp., Los Angeles, Calif.
V-Belt Clutch Co., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
W. C. Products, Inc., Santa Monica, Calif.
Webster Electric Co., Racine, Wis. (modulating drive for forced warm air heating systems)
Wood's Sons Co., T. B., Chambersburg, Pa.
Worthington Corp., Harrison, N. J. (v-type)

PULVERIZED COAL BURNERS

See Burners, Pulverized Coal

PUMP BASES

See Bases and Pads, Vibration Isolating

PUMP UNITS, FUEL OIL

See Units, Fuel Oil, Heating, Pumping and Straining

PUMP VALVES

See Valves, Pump

PUMPS, BOILER FEED

Aldrich Pump Co., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Hydrovac, Div. Pitz Foundry, Inc., Brooklyn, N. Y.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Cochrane Corp., Philadelphia, Pa.
Coffin Co., J. S., Jr., Englewood, N. J.
Columbus Steam Pump Wks., Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cyclotherm Div., United States Radiator Corp., Oswego, N. Y.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
DeLaval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eclipse Fuel Engineering Co., Rockford, Ill.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Ingersoll-Rand Co., New York, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnson Corp., The, Three Rivers, Mich.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lattner Mfg. Co., P. M., Cedar Rapids, Iowa
Lawrence Pump & Engine Co., Lawrence, Mass.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
McDonnell & Miller, Inc., Chicago, Ill.
Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Robbins & Myers, Inc., Springfield, O.
Roth Co., Roy E., Rock Island, Ill.
Schaub Engineering Co., Fred H., Chicago, Ill.
Skidmore Corp., St. Joseph, Mich.
Sta-Rite Products, Inc., Delavan, Wis.
Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swaby Mfg. Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, CENTRIFUGAL

Alliance Industries, Huntingden Valley, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Wks., Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Barrett, Haentjens & Co., Hazleton, Pa.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Bell & Gossett Co., Morton Grove, Ill.
Blaisdell Compressor Co., New York, N. Y.
Buffalo Pumps, Inc., Buffalo, N. Y.
Bump Pump Co., LaCrosse, Wis.
Byron Jackson Co., Los Angeles, Calif.
Carver Pump Co., Muscatine, Ia.
Chain Belt Co., Milwaukee, Wis.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., New York, N. Y.
Dayton Electric Mfg. Co., Chicago, Ill.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
DeLaval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Dunham Co., C. A., Chicago, Ill.
Duriron Co., Inc., Dayton, O. (Acid resisting)
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries Inc., New Haven, Conn.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Works, Inc., Brooklyn, N. Y.
Frederick Iron & Steel Inc., Frederick, Md.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Gardner-Denver Co., Quincy, Ill.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware)
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gorman-Rupp Co., Mansfield, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Ingersoll-Rand Co., New York, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Kenco, Inc., Lorain, O.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
La Bour Co., Inc., The, Elkhart, Ind.
Lawrence Pump & Engine Co., Lawrence, Mass.
Lead Lined Iron Pipe Co., Wakefield, Mass. (lead lined and all lead)
Lecourtenay Co., Newark, N. J.
Lewis & Co., Inc., Chas. S., St. Louis, Mo.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Marlow Pumps, Ridgewood, N. J.
Morey, Dan, Los Angeles, Calif.
Morris Machine Works, Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pacific Pumping Co., Oakland, Calif.
Palmer Electric Co., Detroit, Mich.
Peerless of America, Inc., Chicago, Ill.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Red Jacket Mfg. Co., Davenport, Ia.
Ruthman Machinery Co., Cincinnati, O.
Saran Lined Pipe Co., Ferndale, Mich. (Saran Lined)
Schneible Co., Claude B., Detroit, Mich.
Skidmore Corp., St. Joseph, Mich.
Smith Corp., A. O., Milwaukee, Wis.
Standard Electric Mfg. Co., West Berlin, N. J.
Sta-Rite Products, Inc., Delavan, Wis.

Sterling, Inc., Milwaukee, Wis.
Sumo Pumps, Inc., Stamford, Conn. (for submerged operation)
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Trane Co., The, LaCrosse, Wis.
Tri-Clover Machine Co., Kenosha, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Utility Appliance Corp., Los Angeles, Calif.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Warren Steam Pump Co., Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, CONDENSATION RETURN

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Hydrovac, Div. Pitz Foundry, Inc., Brooklyn, N. Y.
American Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Cochrane Corp., Philadelphia, Pa.
Coffin Co., J. S., Jr., Englewood, N. J.
Columbus Steam Pump Wks. Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Dean Hill Pump Co., Indianapolis, Ind.
Decatur Pump Co., Decatur, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham Co., C. A., Chicago, Ill.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., New Haven, Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Faber Engineering Co., Inc., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Heating Assurance, Inc., Spokane, Wash.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Ingersoll-Rand Co., New York, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnson Corp., The, Three Rivers, Mich.
Kenco, Inc., Lorain, O.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Lattner Mfg. Co., P. M., Cedar Rapids, Iowa
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O
Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Myers & Bro. Co., F. E., The, Ashland, O.
Nash Engineering Co., South Norwalk, Conn.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp. Los Angeles Calif.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Roth Co., Roy E., Rock Island, Ill.
Schaub Engineering Co., Fred H., Chicago, Ill.
Sellers Engineering Co., Chicago, Ill.
Skidmore Corp., St. Joseph, Mo.
Sta-Rite Products, Inc., Delavan, Wis.
Sterling, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Swaby Mfg. Co., Chicago, Ill.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Trane Co., The, LaCrosse, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, DEEP WELL, TURBINE

American Well Wks., Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Byron Jackson Co., Los Angeles, Calif.
Davidson Co., M. T., New York, N. Y
Decatur Pump Co, Decatur, Ill. (shallow well)
Deming Co., Salem, O.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Layne & Bowler, Inc., Memphis, Tenn.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div, Food Machinery & Chemical Corp., Los Angeles, Calif.
Red Jacket Mfg. Co., Davenport, Ia.
Smith Corp., A. O., Milwaukee, Wis.
Sta-Rite Products, Inc., Delavan, Wis.
Worthington Corp., Harrison, N. J.

PUMPS, FIRE

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Davidson Co., M. T., New York, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Gorman-Rupp Co., Mansfield, O.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Layne & Bowler, Inc., Memphis, Tenn.
Lecourtenay Co., Newark, N. J.
Leyman Mfg. Corp., John H. McGowan Co. Div., Cincinnati, O.
Marlow Pumps, Ridgewood, N. J.
Myers & Bro. Co., F. E., The, Ashland, O.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Worthington Corp., Harrison, N. J.

PUMPS, HIGH PRESSURE, HYDRAULIC

Aldrich Pump Co., Allentown, Pa.
American Engineering Co., Philadelphia, Pa.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Blackhawk Mfg. Co., Milwaukee, Wis.
Byron Jackson Co., Los Angeles, Calif.
Capitol Machine Works, Oakland, Calif. (for testing radiant heating systems and piping)
Carpenter Mfg. Corp., The, Cleveland, O. (hand)
Commercial Shearing & Stamping Co., Youngstown, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., New York, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Dudgeon, Inc, Richard, Brooklyn, N. Y.
Gorman-Rupp Co., Mansfield, O.
Guild & Garrison, Inc., Brooklyn, N. Y.
Kobe Inc., Div. of Dresser Equipment Co., Huntington Park, Calif.
Ledeen Mfg. Co., Los Angeles, Calif.
Milton Roy Co., Philadelphia, Pa.
National Steam Pump Co., Upper Sandusky, O.
Robbins & Myers, Inc., Springfield, O.
Roper Corp., Geo. D., Rockford, Ill.
Royalton Co., Inc., Gasport, N. Y.
Sta-Rite Products, Inc., Delavan, Wis.
Struthers Wells Corp., Titusville, Pa.
Texsteam Corp., Houston, Tex.
Union Steam Pump Co., Battle Creek, Mich.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

PUMPS, LIQUID REFRIGERANT CIRCULATING

Alliance Industries, Huntingden Valley, Pa.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davidson Co., M. T., New York, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Lewis & Co., Chas. S., St. Louis, Mo.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Roper Corp., Geo. D., Rockford, Ill.
Roth Co., Roy E., Rock Island, Ill.
Viking Pump Co., Cedar Falls, Ia.
Vilter Mfg. Co., Milwaukee, Wis.
Warren Steam Pump Co., Inc., Warren, Mass.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Worthington Corp., Harrison, N. J.

PUMPS, PROPELLER

American Well Works, Aurora, Ill.
Byron Jackson Co., Los Angeles, Calif.
Frederick Iron & Steel Inc., Frederick, Md.
Haertel Co., Walter, Minneapolis, Minn.
Ingersoll-Rand Co., New York, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Morris Machine Wks., Baldwinsville, N. Y.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles Calif.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Ruthman Machinery Co., Cincinnati, O.
Tri-Clover Machine Co., Kenosha, Wis.
Warren Steam Pump Co., Inc., Warren, Mass.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Worthington Corp., Harrison, N. J.

PUMPS, PROPORTIONING

Bird-Archer Co., Philadelphia, Pa.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Cochrane Corp., Philadelphia, Pa.
Dearborn Chemical Co., Chicago, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
Madden Corp., The, Chicago, Ill.
Marco Co., Inc., Wilmington, Del.
Milton Roy Co., Philadelphia, Pa.
Nelson Chemical Pumps, Casper, Wyo.
% Proportioneers, Inc., %, Providence, R. I.
Robbins & Myers, Inc., Springfield, O.
Texsteam Corp., Houston, Tex.
Wallace & Tiernan Co., Inc., Newark, N. J.

PUMPS, RECIPROCATING

Aldrich Pump Co., Allentown, Pa.
Altens Foundry & Machine Works, Inc., Lancaster, O.
American Hard Rubber Co., New York, N. Y. (Rubber and Rubber lined)
American-Marsh Pumps, Inc., Battle Creek, Mich
Binks Mfg. Co., Chicago, Ill.
Columbus Steam Pump Wks., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind
Delco Appliance Div., General Motors Corp., Rochester, N. Y.
Deming Co., Salem, O.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Duro Co., Dayton, O.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y
Gray Company, Inc., Minneapolis, Minn.
Guild & Garrison, Inc., Brooklyn, N. Y.
Hills-McCanna Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Ingersoll-Rand Co., New York, N. Y.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Milton Roy Co., Philadelphia, Pa.
Myers & Bro. Co., F. E., The, Ashland, O.
National Steam Pump Co., Upper Sandusky, O
National Water Lift Inc., Kalamazoo, Mich.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles Calif.
Red Jacket Mfg. Co., Davenport, Ia.
Royalton Co., Inc., Gasport, N. Y.
Ross Valve Mfg. Co., Inc., Troy, N. Y
Sta-Rite Products, Inc., Delavan, Wis.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Worthington Corp., Harrison, N. J.

PUMPS, ROTARY

American Engineering Co., Philadelphia, Pa.
American Hard Rubber Co., New York, N. Y. (Rubber and rubber lined)
Beach-Russ Co., New York, N. Y.
Blackmer Pump Co., Grand Rapids, Mich.
Bowser, Inc., Fort Wayne, Ind.
Bump Pump Co., La Crosse, Wis.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Duriron Co., Inc., The, Dayton, O. (Acid resisting)
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., New Haven, Conn.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Gray Co., Inc., Minneapolis, Minn.
Hypro Engineering Co., Minneapolis, Minn.
Jabsco Pump Co., Burbank, Calif.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Marco Co., Inc, Wilmington, Del.
May Oil Burner Div., May Fuel Oil Corp., Baltimore, Md.
Nash Engineering Co., South Norwalk, Conn.
Oberdorfer Foundries, Inc., Syracuse, N. Y.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Polo Pump Co., Polo, Ill.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower Div., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Roth Co., Roy E., Rock Island, Ill.
St. Louis Tool Co., St. Louis, Mo.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Sier Bath Gear & Pump Co., Inc., North Bergen, N. J.
Sundstrand Machine Tool Co., Hydraulic Div., Rockford, Ill. (for oil burners)
Taber Pump Co., Buffalo, N. Y.
Trimount Rotary Power Co., Dedham, Mass.
Tuthill Pump Co., Chicago, Ill.
Vanton Pump Corp., New York, N. Y.
Viking Pump Co., Cedar Falls, Ia.
Waukesha Foundry Co., Waukesha, Wis.
Webster Electric Co., Racine, Wis.
Worthington Corp., Harrison, N. J.
Yale & Towne Mfg. Co., Stamford, Conn.

PUMPS, SEWAGE AND SLUDGE

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
American Well Works, Aurora, Ill.
Aurora Pump Co., Aurora, Ill.
Barnes Manufacturing Co., Mansfield, O.
Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Davison Co., M. T., New York, N. Y.
De Laval Steam Turbine Co., Trenton, N. J.
Deming Co., Salem, O.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Frederick Iron & Steel Inc., Frederick, Md.
Gardner-Denver Co., Quincy, Ill.
Gorman-Rupp Co., Mansfield, O.
Guild & Garrison, Inc., Brooklyn, N. Y
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Kingsford Foundry & Machine Works, Oswego, N. Y.
Marlow Pumps, Ridgewood, N. J.
Morris Machine Wks., Baldwinsville, N. Y.
Pacific Pumping Co., Oakland, Calif.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Robbins & Myers, Inc., Springfield, O.
Swaby Mfg. Co., Chicago, Ill.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, STEAM

American-Marsh Pumps, Inc., Battle Creek, Mich.
Columbus Steam Pump Wks., Co., Columbus, O.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Fairbanks Morse & Co., Chicago, Ill.
Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Jacuzzi Bros., Inc., Richmond, Calif.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O
National Steam Pump Co., Upper Sandusky, O
Penberthy Injector Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Worthington Corp., Harrison, N. J.

PUMPS, SUMP

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aurora Pump Co., Aurora, Ill.
Barnes Mfg. Co., Mansfield, O.
Barrett, Haentjens & Co., Hazleton, Pa.
Bruner Corp., Milwaukee, Wis.
Buffalo Pumps, Inc., Buffalo, N. Y.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pneumatic Tool Co., New York, N. Y.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.

Davidson Co., M. T., New York, N. Y.
Dayton Electric Mfg. Co., Chicago, Ill.
Deming Co., Salem, O.
Duro Co., Dayton, O.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eastern Industries, Inc., New Haven, Conn.
Everite Pump & Mfg. Co., Inc., Lancaster, Pa.
Fairbanks, Morse & Co., Chicago, Ill.
Frederick Iron & Steel Inc., Frederick, Md.
Friermood Machine Works, Converse, Ind.
Gardner-Denver Co., Quincy, Ill.
Gorman-Rupp Co., Mansfield, O.
Goulds Pump, Inc., Seneca Falls, N. Y.
Guild & Garrison, Inc., Brooklyn, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Independent Pneumatic Tool Co., Aurora, Ill.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Kenco, Inc., Lorain, O.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kol-Master Corp., Oregon, Ill.
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla.
(small units for removal of condensation in air conditioning units)
Marlow Pumps, Ridgewood, N. J.
Morris Machine Wks., Baldwinsville, N. Y.
Myers & Bro. Co., F. E., The, Ashland, O.
Noera Mfg. Co., Div., Chase Brass & Copper Co., Waterbury, Conn.
Pacific Pumping Co., Oakland, Calif.
Peerless of America, Inc., Chicago, Ill.
Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Penberthy Injector Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Peters-Dalton, Inc., Detroit, Mich.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, O.
Roth Co., Roy E., Rock Island, Ill.
Schneible Co., Claude B., Detroit, Mich.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Skidmore Corp., St. Joseph, Mich.
Standard Electric Mfg. Co., West Berlin, N. J.
Sta-Rite Products, Inc., Delavan, Wis.
Swaby Mfg. Co., Chicago, Ill.
Taber Pump Co., Buffalo, N. Y.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Uniflow Mfg. Co., Erie, Pa.
Union Steam Pump Co., Battle Creek, Mich.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Wade Mfg. Co., Elgin, Ill.
Warren Steam Pump Co., Inc., Warren, Mass.
Weil Pump Co., Chicago, Ill.
Weinman Pump Mfg. Co., The, Columbus, O.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, VACUUM

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Aminco Refrigeration Products Co., Detroit, Mich.
Barrett, Haentjens & Co., Hazleton, Pa.
Beach-Russ Co., New York, N. Y.
Bury Compressor Co., Erie, Pa.
Chicago Pneumatic Tool Co., New York, N. Y.
Chicago Pump Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Daigger & Co., A., Chicago, Ill.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham Co., C. A., Chicago, Ill.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Eisler Engineering Co., Inc., Newark, N. J.
Electric Sprayit Co., The, Sheboygan, Wis.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Foster Wheeler Corp., New York, N. Y.
Fuller Co., Catasaqua, Pa.
Gardner-Denver Co., Quincy, Ill.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware)
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Joy Mfg. Co., Pittsburgh, Pa.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lammert & Mann Co., Chicago, Ill.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Nash Engineering Co., South Norwalk, Conn.
National Steam Pump Co., Upper Sandusky, O.
Penberthy Injector Co., Div. of Buffalo Eclipse Corp., Detroit, Mich.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pioneer Pump & Mfg. Co., Detroit, Mich.
Research Vacuum Supply Co., Chicago, Ill.
Roots-Connersville Blower Div., Connersville, Ind.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Skidmore Corp., St. Joseph, Mich.
Stokes Machine Co., F. J., Philadelphia, Pa.
Trimount Rotary Power Co., Dedham, Mass.
Viking Pump Co., Cedar Falls, Ia.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Will Corp., Rochester, N. Y.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUMPS, VACUUM HEATING

American Hydrovac, Div. Pitz Foundry, Inc.., Brooklyn, N. Y.
American Marsh Pumps, Inc., Battle Creek, Mich.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dunham Co., C. A., Chicago, Ill.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Faber Engineering Co., Inc., Philadelphia, Pa.
Gardner-Denver Co., Quincy, Ill.
Guild & Garrison, Inc., Brooklyn, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Nash Engineering Co., South Norwalk, Conn.
Skidmore Corp., St. Joseph, Mich.
Sterling, Inc., Milwaukee, Wis.
Union Steam Pump Co., Battle Creek, Mich.
Warren Steam Pump Co., Inc., Warren, Mass.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., Harrison, N. J.

PUMPS, VISCOUS LIQUIDS AND HEAVY MATERIALS

Aldrich Pump Co., Allentown, Pa.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American-Marsh Pumps, Inc., Battle Creek, Mich.
Beach-Russ Co., New York, N. Y.
Blackmer Pump Co., Grand Rapids, Mich.
Buffalo Pumps, Inc., Buffalo, N. Y.
Bump Pump Co., La Crosse, Wis.
Byron Jackson Co., Los Angeles, Calif.
Chicago Pump Co., Chicago, Ill.
Columbus Steam Pump Wks. Co., Columbus, O.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Davidson Co., M. T., New York, N. Y.
Dean Brothers Pumps, Inc., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Eagan Co., Inc., Walter H., Philadelphia, Pa.
Engineer Co., New York, N. Y.
Fairbanks, Morse & Co., Chicago, Ill.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Frederick Iron & Steel Inc., Frederick, Md.
Gardner-Denver Co., Quincy, Ill.
Goulds Pumps, Inc., Seneca Falls, N. Y.
Gray Co., Inc., Minneapolis, Minn.
Guild & Garrison, Inc., Brooklyn, N. Y.
Ingersoll-Rand Co., New York, N. Y.
Jabsco Pump Co., Burbank, Calif.
Jacuzzi Bros., Inc., Richmond, Calif.
Kingsford Foundry & Machine Wks., Oswego, N. Y.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lawrence Pump & Engine Co., Lawrence, Mass.
Leyman Mfg. Corp., John H. McGowan Co., Div., Cincinnati, O.
Madden Corp., The, Chicago, Ill.
Marco Co., Inc., Wilmington, Del.
Milton Roy Co., Philadephia, Pa.
Morris Machine Wks., Baldwinsville, N. Y.
Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Red Jacket Mfg. Co., Davenport, Ia.
Robbins & Myers, Inc., Springfield, O.
Roots-Connersville Blower Div., Connersville, Ind.
Roper Corp., Geo. D., Rockford, Ill.
Royalton Co., Inc., Gasport, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Taber Pump Co., Buffalo, N. Y.
Tuthill Pump Co., Chicago, Ill.
Union Steam Pump Co., Battle Creek, Mich.
Vanton Pump Corp., New York, N. Y.
Viking Pump Co., Cedar Falls, Ia.
Warren Steam Pump Co., Inc., Warren, Mass.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Whittington Pump & Engineering Corp., Indianapolis, Ind.
Worthington Corp., Harrison, N. J.
Yeomans Bros. Co., Melrose Park, Ill.

PUNCHES, SHEET METAL

Blackhawk Mfg. Co., Milwaukee, Wis.
Bliss Co., E. W., Canton, O.
Callahan Can Machine Co., Inc., Brooklyn, N. Y.
Champion Blower & Forge Co., Lancaster, Pa.

Cleveland Punch & Shear Wks. Co., Cleveland, O.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore Co., Beloit, Wis.
Henry & Wright, Div. of Emhart Mfg. Co., Hartford, Conn.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
Leslie Welding Co., Inc., Chicago, Ill.
M-M-A, Inc., Lancaster, Pa.
New Albany Machine Mfg. Co., New Albany, Ind.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Parker-Kalon Corp., New York, N. Y.
Peck, Stow & Wilcox Co., Southington, Conn.
Perkins Machine Co., Warren, Mass.
Reiner & Campbell Co., Inc., Newark, N. J.
Swaine Mfg. Co., Fred J., St. Louis, Mo.
Thor Tool & Die Co., San Leandro, Calif.
Webb Corp., The, Webb City, Mo.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Weidemann Machine Co., Philadelphia, Pa.
Zeh & Hahnemann Co., Newark, N. J.

PURGERS, REFRIGERANT GAS

Armstrong Machine Works, Three Rivers, Mich.
Frick Co., Waynesboro, Pa.
Mueller Brass Co., Port Huron, Mich.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
York Corp., York, Pa.

PUSHERS, PIPE, HYDRAULIC

Blackhawk Mfg. Co., Milwaukee, Wis.
Dudgeon, Inc., Richard, Brooklyn, N. Y.
Giant Mfg. Co., Council Bluffs, Ia.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill

RACKS, STORAGE, PIPE

Berger Mfg. Div., Republic Steel Corp., Canton, Ohio

RADIANT HEATING AND COOLING

See Coils and Panels, Radiant Heating, Prefabricated

RADIATION, BASEBOARD

For special fittings, see Fittings, Pipe, Special, for Baseboard Radiation

RADIATION, BASEBOARD, FERROUS

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa
Autorad Inc., Chicago, Ill.
Baseline Mfg. Co., Minneapolis, Minn.
Brown Products Co., Forest Hills, N. Y.
Burnham Corp., Boiler Div., Irvington, N. Y.
Crane Co., Chicago, Ill.
Dunham Co., C. A., Chicago, Ill.
Edwards Engineering Corp., Pompton Plains, N. J.
Kritzer Radiant Coils, Inc., Chicago, Ill.
Lee Vine Fin-Tube Radiator Co., Inc., New Haven, Conn.
Rempe Co., Chicago, Ill.
Rittling Corp., The, Hamburg, N. Y.
Smith Co., Inc., H. B., The, Westfield, Mass.
Sterling Radiator Co., Inc., Westfield, Mass.
Trane Co., The, La Crosse, Wis.
Utica Radiator Corp., Utica, N. Y.
Vulcan Radiator Co., Hartford, Conn.
Weil-McLain Co., Michigan City, Ind.

RADIATION, BASEBOARD, NON-FERROUS

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Baseline Mfg. Corp., Minneapolis, Minn.
Brown Products Co., Forest Hills, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Dunham Co., C. A., Chicago, Ill.
Fedders-Quigan Corp., Buffalo, N. Y.
G & O Mfg. Co., New Haven, Conn.
Hooper Engineering Co., Detroit, Mich.
Huron Boiler Co., Detroit, Mich.
Kritzer Radiant Coils, Inc., Chicago, Ill
National Radiator Co., The, Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
Radiant Baseboard Panels, Inc., New Britain, Conn.
Radiant-Ray Radiation, Inc., New Britain, Conn.
Rittling Corp., Hamburg, N. Y.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Sterling Radiator Co., Inc., Westfield, Mass.
Tenney Engineering, Inc., Newark; N. J.
Trane Co., The, La Crosse, Wis.
United States Radiator Corp., Detroit, Mich.
Vulcan Radiator Co., Hartford, Conn.
Webster & Co., Warren, Camden, N. J.

RADIANT HEAT THERMOSTATS

See Thermostats, Radiant Heat

RADIANT HEATING ELECTRICAL CONDUCTORS

See Conductors, Electrical, for Radiant Heating

RADIATION, CONVECTION TYPE, FERROUS

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Autorad Inc., Chicago, Ill.
Brown Fintube Co., The, Elyria, O.
Brown Products Co., Forest Hills, N. Y.
Dunham Co., C. A., Chicago, Ill.
Kritzer Radiant Coils, Inc., Chicago, Ill.
Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
Rempe Co., Chicago, Ill.
Rittling Corp., The, Hamburg, N. Y.
Stedco Products, Wilkes-Barre, Pa.
Tenney Engineering Inc., Newark, N. J.
United States Radiator Corp., Detroit, Mich.
Webster & Co., Warren, Camden, N. J.
Weil-McLain Co., Chicago, Ill.

RADIATION, CONVECTION TYPE, NON-FERROUS

Acme Industries, Inc., Jackson, Mich.
Airtherm Mfg. Co., St. Louis, Mo.
American Coils Co., Newark, N. J.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Beacon-Morris Corp., Boston, Mass.
Brown Fintube Co., The, Elyria, O.
Brown Products Co., Forest Hills, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Dunham Co., C. A., Chicago, Ill.
Fedders-Quigan Corp., Buffalo, N. Y.
G. & O. Mfg. Co., New Haven, Conn.
Kehm Corp., The, Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
Kritzer Radiant Coils, Inc., Chicago, Ill.
Modine Mfg. Co., Racine, Wis.
National Radiator Co., The, Johnstown, Pa.
Nesbitt Inc., John J., Philadelphia, Pa.
Peerless of America, Inc., Chicago, Ill.
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Refrigeration Economics Co., Inc., Canton, O.
Republic Products Co., Philadelphia, Pa.
Rittling Corp., The, Hamburg, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Tenney Engineering Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
Tuttle & Bailey, Inc., New Britain, Conn.
United States Radiator Corp., Detroit, Mich.
Universal Convector Corp., New York, N. Y.
Vapor Heating Corp., Chicago, Ill.
Webster & Co., Warren, Camden, N. J.
Young Radiator Co., Racine, Wis.

RADIATION, DIRECT

American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Burnham Corp., Boiler Div., Irvington, N. Y.
Clifford Mfg. Co., Div. of Standard Thomson Corp., Waltham, Mass (For aircraft)
Clow & Sons, James B., Chicago, Ill. (Gas fired)
Crane Co., Chicago, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
Rittling Corp., The, Hamburg, N. Y.
United States Radiator Corp., Detroit, Mich.
Utica Radiator Corp., Utica, N. Y.
Weil-McLain Co., Michigan City, Ind.
Wilson Engineering Corp., Chicago, Ill.

RADIATION, FIN TUBE TYPE

American Coils Co., Newark, N. J.
Auburn Burner Co., Auburn, Ind.
Autorad Inc., Chicago, Ill.
Baseline Mfg. Co., Minneapolis, Minn.
Brown Products Co., Forest Hills, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Dunham Co., C. A., Chicago, Ill.
Edwards Engineering Corp., Pompton Plains, N. J.
Fedders-Quigan Corp., Buffalo, N. Y.
G & O Mfg. Co., New Haven, Conn.
Kramer Trenton Co., Trenton, N. J.
Kritzer Radiant Coils, Inc., Chicago, Ill.
Lee Vine Fin-Tube Radiator Co., Inc., New Haven, Conn.
National Radiator Co., The, Johnstown, Pa.
Nesbitt, Inc., John J., Philadelphia, Pa.
Peerless of America, Inc., Chicago, Ill.
Radiant-Ray Radiation, Inc., New Britain, Conn.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Rittling Corp., The, Hamburg, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Shaw-Perkins Mfg. Co., Pittsburgh, Pa.
Slant Fin Radiator Corp., Brooklyn, N. Y.
Smith Co., Inc., H. B., The, Westfield, Mass.

Stedco Products, Wilkes-Barre, Pa.
Sterling Radiator Co., Inc., Westfield, Mass.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
United States Radiator Corp., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Vulcan Radiator Co., Hartford, Conn.
Webster & Co., Warren, Camden, N. J.

RADIATOR AND CONVECTOR HUMIDIFIERS

See Humidifiers for Radiators and Convectors

RADIATOR HANGERS

See Hangers or Brackets, Radiator

RADIATOR ORIFICES

See Orifices, Radiator

RADIATOR ORIFICE VALVES

See Valves, Radiator, Orifice

RADIATOR VALVES

See Valves, Radiator

RADIATOR VENT VALVE HUMIDIFIERS

See Humidifiers, Radiator Vent Valve

RADIATORS, ELECTRIC

Acrow, Inc., Newark, N. J.
Burnham Corp., Boiler Div., Irvington, N. Y.
Conco Engineering Wks., Div. of H. D. Conkey & Co., Mendota, Ill.
Meco, Inc., Portland, Ore.
Trent, Inc., Philadelphia, Pa.

RADIATORS, GAS FIRED

Clow & Sons, James B., Chicago, Ill.

RADIATORS, HUMIDIFYING

Murray Mfg. Co., D. J., Wausau, Wis.

RATCHET WRENCHES

See Wrenches, Ratchet

REAMERS, PIPE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Crown Die & Tool Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Independent Pneumatic Tool Co., Aurora, Ill.
Mueller Co., Decatur, Ill.
Nye Tool Co., Chicago, Ill.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.

RECIPROCATING PUMPS

See Pumps, Reciprocating

RECORDER-CONTROLLERS, COMBINED TEMPERATURE AND HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Instrument Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Weston Electrical Instrument Corp., Newark, N. J.

RECORDER-CONTROLLERS, HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Weksler Thermometer Corp., New York, N. Y.
Weston Electical Instrument Corp., Newark, N. J.

RECORDER-CONTROLLERS, PRESSURE

Automatic Control Co., St. Paul, Minn.
Bailey Meter Co., Cleveland, O.
Baldwin-Lima-Hamilton Corp., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
United States Gauge, Div. of American Machine and Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

RECORDER-CONTROLLERS, TEMPERATURE

American Instrument Co., Inc., Silver Spring, Md.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Scientific Instrument Co., Detroit, Mich.
Shallcross Controls, Inc., Milwaukee, Wis.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge, Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

RECORDERS, CARBON DIOXIDE

Cole-Sewell Engineering Co., St. Paul, Minn.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., Newark, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engelhard, Inc., Charles, Newark, N. J.
Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Leeds & Northrup Co., Philadelphia, Pa.
Permutit Co., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Victory Engineering Corp., Union, N. J.

RECORDERS, COMBINED TEMPERATURE AND HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.

Moeller Instrument Co., Richmond Hill, N. Y.
Powers Regulator Co., Skokie, Ill.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

RECORDERS, DEW POINT

American Instrument Co., Inc., Silver Spring, Md.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Foxboro Co., Foxboro, Mass.
Surface Combustion Corp., Toledo, O.

RECORDERS, DRAFT

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Foxboro Co., Foxboro, Mass.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Uehling Instrument Co., Paterson, N. J.
Victory Engineering Corp., Union, N. J.

RECORDERS, HUMIDITY

American Instrument Co., Inc., Silver Spring, Md.
Bristol Co., The, Waterbury, Conn.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Garden City Instruments, Inc., Chicago, Ill.
Leeds & Northrup Co., Philadelphia, Pa.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia Pa.
Moeller Instrument Co., Richmond Hill, N. Y
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Instruments Div., Weston Electrical Instrument Corp. Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y
Trerice Co., H. O , Detroit, Mich.
United States Gauge, Div. of American Machine & Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

RECORDERS, LIQUID LEVEL

Automatic Control Co., St. Paul, Minn.
Bailey Meter Co., Cleveland, O.
Barton Instrument Corp., Los Angeles, Calif.
Bristol Co., The, Waterbury, Conn.
Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Defender Instrument & Regulator Co., St. Louis, Mo.
Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Liquidometer Corp., Long Island City, N. Y.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Taylor Instrument Companies, Rochester, N. Y.
Uehling Instrument Co., Paterson, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.
Yarnall-Waring Co., Philadelphia, Pa.

RECORDERS, OXYGEN

Bailey Meter Co., Cleveland, O.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Mine Safety Appliances Co., Pittsburgh, Pa.
Victory Engineering Corp., Union, N. J.

RECORDERS, PRESSURE AND VACUUM

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Baldwin-Lima-Hamilton Corp., Philadelphia, Pa.
Bristol Co., The, Waterbury, Conn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Dickson Co., The, Chicago, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Electro Products Laboratories, Inc., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Garden City Instruments, Inc., Chicago, Ill.
Giannini & Co., Inc., Pasadena, Calif.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hastings Instrument Co., Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Stokes Machine Co., F. J., Philadelphia, Pa.
Swartwout Co., The, Cleveland, Ohio
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Uehling Instrument Co., Paterson, N. J.
United States Gauge, Div. of American Machine and Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

RECORDERS, SMOKE DENSITY

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Combustion Control Corp., Cambridge, Mass.
De-Tec-Tronic Laboratories, Inc., Chicago, Ill.
Edwards, L. V., Rockville Center, N. Y.
Ess Instrument Co., Bergenfield, N. J.
Ess Specialty Corp., Bergenfield, N. J
General Power Plant Corp., Ossining, N. Y.
Leeds & Northrup Co., Philadelphia, Pa.
Sterns-Flinn Corp., New York, N. Y.

RECORDERS, TEMPERATURE

American Instrument Co., Inc., Silver Spring, Md.
Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Defender Instrument and Regulator Co., St. Louis, Mo.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Engelhard, Inc., Charles, Newark, N. J.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Gotham Instrument Co., Div., American Machine & Metals, Inc., Philadelphia, Pa.
H-B Instrument Co., Philadelphia, Pa.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mason-Neilan Regulator Co., Boston, Mass.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Moore Products Co., Philadelphia, Pa.
Palmer Thermometers, Inc., Cincinnati (Norwood), O. (Mercury actuated)
Penn Industrial Instrument Corp., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Republic Flow Meters Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge, Div. of American Machine and Metals, Inc., Sellersville, Pa.
Victory Engineering Corp., Union, N. J.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

RECORDING THERMOMETERS

See Recorders, Temperature

RECOVERY EQUIPMENT, AIR

See Adsorbers, Odor

REDUCERS, SPEED

Abart Gear & Machine Co., Chicago, Ill.
Adams Co., The, Dubuque, Iowa
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Pulley Co., Philadelphia, Pa.
Bodine Electric Co., Chicago, Ill.
Boston Gear Wks., Inc., North Quincy, Mass.
Brown-Brockmeyer Co., Inc., Dayton, O.
Chicago Die Casting Mfg. Co., Chicago, Ill.
De Laval Steam Turbine Co., Trenton, N. J.
Doall Co., The, Des Plaines, Ill.
Dodge Mfg. Corp., Mishawaka, Ind.
Falk Corp., Milwaukee, Wis.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Graham Transmissions, Inc., Milwaukee, Wis.
Janette Electric Mfg. Co., Morton Grove, Ill.
Jones Foundry & Machine Co., W. A., Chicago, Ill.
Lima Electric Motor Co., The, Lima, O.
Link Belt Co., Philadelphia, Pa.
Medart Co., St. Louis, Mo.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Poole Foundry & Machine Co., Baltimore, Md.
Reliance Electric & Engineering Co., Cleveland, O.
Shallcross Controls, Inc., Milwaukee, Wis.
Smith Corp., Winfield H., Springville, N. Y.
Star-Kimble Motor Div., Miehle Prntg. Press & Mfg. Co., Bloomfield, N. J.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
Stephens Adamson Mfg. Co., Aurora, Ill.
Sterling Electric Motors, Inc., Los Angeles, Calif.
U. S. Electrical Motors, Inc., Los Angeles, Calif.
Westinghouse Electric Corp., Pittsburgh, Pa.

REFRACTORIES AND REFRACTORY CEMENT

Allen Co., Robert G., Mechanicsville, N. Y.
Armstrong Cork Co., Lancaster, Pa.
Babcock & Wilcox Co., New York, N. Y.
Basic Refractories, Inc., Cleveland, O.
Botfield Refractories Co., Philadelphia, Pa.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Chicago Fire Brick Co., Chicago, Ill.
Elraco Engineering Co., Los Angeles, Calif.
Fireline Stove & Furnace Lining Co., Chicago, Ill.
General Insulating Products Co., Brooklyn, N. Y.
Green Fire Brick Co., Mexico, Mo.
Johns-Manville, New York, N. Y.
Kellogg Co., M. W., The, New York, N. Y.
Krehbiel Co., J. H., Chicago, Ill.
Laclede-Christy Co., St. Louis, Mo.
McLeod & Henry Co., Inc., Troy, N. Y.
Monogram Products Co., Inc., Philadelphia, Pa.
Nebel Mfg. Co., Cleveland, O.
Norton Co., Worcester, Mass.
Plibrico Jointless Firebrick Co., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrolite Products Co., Cleveland, O.
Quigley Co., Inc., New York, N. Y.
Ramtite Co., The, Chicago, Ill.
Refractory & Insulation Corp., New York, N. Y.
Reintjes Co., Geo. P., Kansas City, Mo.
Rex Clay Products Co., Detroit, Mich.
Rutland Fire Clay Co., Rutland, Vt.
S.O.S. Products Co., Inc., Brooklyn, N. Y.
Saverite Engineering Co., Hoboken, N. J.
Standard Fuel Engineering Co., Detroit, Mich.
Taylor Sons Co., Charles, Cincinnati, O.
United States Stoneware Co., New York, N. Y.
Walsh Refractories Corp., St. Louis, Mo.
Zonolite Co., Chicago, Ill.

REFRIGERANT DEHYDRATORS

See Dehydrators, Refrigerant

REFRIGERANT FILTERS

See Filters, Refrigerant

REFRIGERANT GAS PURGERS

See Purgers, Refrigerant Gas

REFRIGERANTS

Ansul Chemical Co., Refrigeration Div. Marinette, Wis. (methyl chloride, sulphur dioxide)
Armour and Co., Ammonia Div., Chicago, Ill. (ammonia)
Dow Chemical Co., The, Midland, Mich.
du Pont de Nemours & Co., Inc., E. I. Polychemicals Dept., Wilmington, Del. (National anhydrous ammonia)
du Pont de Nemours & Co., Inc., E. I., Kinetic Chemicals Div., Wilmington, Del. ("Freon" fluorinated hydro carbon refrigerants)
du Pont de Nemours & Co., Inc., E. I., Electrochemicals Dept., Wilmington, Del. (Methyl chloride and methylene chloride)
Eston Chemicals, Div. American Potash & Chemical Corp., Los Angeles, Calif. (sulfur dioxide methyl chloride)
General Chemicals Div., Allied Chemical & Dye Corp., New York, N. Y. (trichloromonofluromethane and dichlorodifluromethane)
Liquid Carbonic Corp., Chicago, Ill. (carbon dioxide)
Monsanto Chemical Co., Merimac Div., Boston, Mass. (anhydrous ammonia)
Pennsylvania Salt Mfg. Co., Philadelphia, Pa. (ammonia)
Pure Carbonic, Inc., Div. of Air Reduction Co., Inc., New York, N. Y. (carbon dioxide)
Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.
Virginia Smelting Co., West Norfolk, Va., (Methyl chloride, liquid sulphur dioxide, methylene chloride)

REFRIGERATING COMPRESSORS

See Compressors, Refrigerating

REFRIGERATION ACCUMULATORS

See Accumulators, Refrigeration

REFRIGERATION CONTROLS

See Valves, Refrigeration

REFRIGERATION FITTINGS

See Fittings, Refrigeration

REFRIGERATION MANIFOLDS

See Manifolds, Refrigeration

REFRIGERATION VALVES

See Valves, Refrigeration

REGISTERS

See also Diffusers; Grilles; Panels, Perforated, for Air Diffusion

A. & A. Register Co., Cleveland, O.
A-J Mfg. Co., Kansas City, Mo.
Air Control Products, Inc., Coopersville, Mich.
Auer Register Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Best Register Co., Milwaukee, Wis.
Char-Gale Mfg. Co., Minneapolis, Minn.
Controlair Mfg. Co., Los Angeles, Calif.
Diamond Mfg. Co., Wyoming, Pa.
Dole Valve Co., The, Chicago, Ill. (Automatic register)
Empire Ventilation Equipment Co., Long Island City, N. Y.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Harrington & King Perforating Co., Chicago, Ill.
Hart & Cooley Mfg. Co., Holland, Mich.
Hastings Air Conditioning Co., Hastings, Neb.
Hendrick Mfg. Co., Carbondale, Pa.
Independent Register Co., Cleveland, O.
Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Krauser-Boyd, Inc., North Tonawanda, N. Y.
Krueger Air Conditioning Co., Tucson, Ariz.
Lima Register Co., The, Lima, O.
Louvra Corp., The, Union, N. J.
Martin Metal Products Corp., Ferndale, Mich.
Midco Register Corp., St. Paul, Minn.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Patco Mfg. Co., Philadelphia, Pa.
Pennant Corp., Grand Rapids, Mich.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Rock Island Register Co., Rock Island, Ill.
Smith Co., J. B., Philadelphia, Pa.
Standard Stamping & Perforating Co., Chicago, Ill.
Stewart Mfg. Co., Inc., Cedar Grove, N. J.
Thermo-Base Div., Gerwin Industries, Michigan City, Ind.
Titus Mfg. Corp., Waterloo, Ia.
Tuttle & Bailey, Inc., New Britain, Conn.
United States Register Co., Battle Creek, Mich.
Viking Mfg. Corp., Cleveland, O.
Young Regulator Co., Cleveland, O.

REGISTER UNITS, FOR SECONDARY AIR SUPPLY FOR OIL BURNERS

Faber Engineering Co., Philadelphia, Pa.

REGULATORS, AIR VELOCITY

Barber-Colman Co. Rockford, Ill.
Hastings Instrument Co., Inc., Hampton, Va.
Hays Corp., Michigan City, Ind.
Johnson Service Co., Milwaukee, Wis.
Shallcross Controls, Inc., Milwaukee, Wis.
Taylor Instrument Companies, Rochester, N. Y.

REGULATORS, DAMPER SETS

A-P Controls Corp., Milwaukee, Wis.
Acme Mfg. Co., Philadelphia, Pa.
Acro Mfg. Co., The, Columbus, O.
Adams Co., The, Dubuque, Ia.
Air Control Products, Inc., Coopersville, Mich.

Ashcraft Co., J. P., Dallas, Tex.
Automatic Devices Co., Inc., Western Springs, Ill.
Barber-Colman Co., Rockford, Ill.
Cole-Sewell Engineering Co., St. Paul, Minn.
Crown Controls Co., Inc., New Bremen, O.
Detroit Controls Corp., The, Detroit, Mich.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Fossum, M. H., St. Paul, Minn.
General Controls Co., Glendale, Calif.
Gerett Corp., M. A., Milwaukee, Wis.
Hart & Cooley Mfg. Co., Holland, Mich.
Kerentoff, G. L., Cincinnati, O.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Parker-Kalon Corp., New York, N. Y.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Sampsel Time Control, Inc., Spring Valley, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Shallcross Controls, Inc., Milwaukee, Wis.
Trane Co., The, LaCrosse, Wis.
United States Register Co., Battle Creek, Mich.
Young Regulator Co., Cleveland, O.

REGULATORS, DRAFT, COMBUSTION

Askania Regulator Co., Chicago, Ill.
Automatic Devices Co., Inc., Western Springs, Ill.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Canton Stoker Corp., Canton, O.
Cash Co., A. W., Decatur, Ill.
Cleveland Fuel Equipment Co., Cleveland, O.
Cole-Sewell Engineering Co., St. Paul, Minn.
Combustion Equipment Co., Rock Island, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
Engineer Co., New York, N. Y.
Engineered Products Co., Philadelphia, Pa.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Foster Wheeler Corp., New York, N. Y.
Foxboro Co., Foxboro, Mass.
Fuelguard Co., Dallas, Tex.
General Blower Co., Inc., Philadelphia, Pa.
General Power Plant Corp., Ossining, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Illinois Engineering Co., Chicago, Ill.
Kol-Master Corp., Oregon, Ill.
Krueger Sentry Gauge Co., Green Bay, Wis.
Leahy Mfg. Co., Los Angeles, Calif.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Perfex Corp., Milwaukee, Wis.
Preferred Utilities Mfg. Corp., New York, N. Y.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Simplex Mfg. Co., Fond du Lac, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Webster Engineering Co., Tulsa, Okla.

REGULATORS, FLUID FLOW, FOR CONSTANT VOLUME

Independent of Pressure

Askania Regulator Co., Chicago, Ill.
Cla-Val Co., Alhambra, Calif.
Hays Corp., Michigan City, Ind.
Kates Co., W. A., The, Deerfield, Ill.
Klipfel Valves, Inc., Hamilton, O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Taco Heaters, Inc., Providence, R. I.

REGULATORS, LEVEL, LIQUID

Alco Valve Co., St. Louis, Mo.
Askania Regulator Co., Chicago, Ill.
Automatic Control Co., St. Paul, Minn.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Belfield Valve, Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Black Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Burrows Mfg. Co., F. A. York, Pa.
Cla-Val Co., Alhambra, Calif.
Cooper Co., Clark, Palmyra, N. J.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Coral Designs, Long Island City, N. Y.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument & Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foxboro Co., Foxboro, Mass.
Golden-Anderson Specialty Co., Pittsburgh, Pa.
Griscom-Russell Co., The, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Instruments, Inc., Tulsa, Okla.
Johnson Corp., The, Three Rivers, Mich.
Johnson Service Co., Milwaukee, Wis.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Liquidepth Indicators, Inc., Long Island City, N. Y.
Magnetrol, Inc., Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Controls Co., Bloomfield, N. J.
Penn Controls, Inc., Goshen, Ind.
Penn Industrial Instrument Corp., Philadelphia, Pa.
R-S Products Corp., Philadelphia, Pa.
Sarco Co., Inc., New York, N. Y.
Sporlan Valve Co., St. Louis, Mo.
Swartwout Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.
United Electric Controls Co., Watertown, Mass.
Weston Electrical Instrument Corp., Newark, N. J.

REGULATORS, PRESSURE, AIR

Air Conversion Research Corp., Chicago, Ill.
American Meter Co., Inc., New York, N. Y.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Binks Mfg. Co., Chicago, Ill.
Boylston Steam Specialty Co., Chicago, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
CCA Products, Inc., Glendale, Calif.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
DeVilbiss Co., The, Toledo, O.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Greiner Co., Emil, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Keller Tool Co., Grand Haven, Mich.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Mason-Nielan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Modern Engineering Co., St. Louis, Mo.
Monitor Controller Co., The, Boston, Mass.

Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Englewood, Colo.
North Penn Co., New York, N. Y.
Norwalk Valve Co., Norwalk, Conn.
Paasche Airbrush Co., Chicago, Ill.
Penn Controls, Inc., Goshen, Ind.
R-S Products Corp., Philadelphia, Pa.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Spray Engineering Co., Somerville, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Squires Co., C. E., The Cleveland, O.
Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls Co., Watertown, Mass.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.

REGULATORS, PRESSURE, GAS

American District Steam Co., Inc., North Tonawanda, N. Y.
American Meter Co., Inc., New York, N. Y.
Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Controls Co., Glendale, Calif.
Greiner Co., Emil, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
Hays Corp., Michigan City, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Industrial Gas Div., Liquid Carbonic Corp., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia Pa.
Modern Engineering Co., St. Louis, Mo.
Monitor Controller Co., The, Boston, Mass.
Moore Products Co., Philadelphia, Pa.
Mueller Co., Decatur, Ill.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Englewood, Colo.
North American Mfg. Co., Cleveland, O.
Norwalk Valve Co., South Norwalk, Conn.
Penn Controls, Inc., Goshen, Ind.
Positive Control Co., The, Cincinnati, O.
Powers Regulator Co., Skokie, Ill.
R-S Products Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill. (Industrial)
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Squires Co., C. E., The, Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Strong, Carlisle & Hammond Co., Cleveland, O.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thermac Co., Los Angeles, Calif.
Trerice Co., H. O., Detroit, Mich.
United Electric Controls Co., Watertown, Mass.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.

REGULATORS, PRESSURE, HOT WATER HEATING SYSTEMS

Bailey Co., Chas., M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chicago Specialty Mfg. Co., Chicago, Ill.
Clark Mfg. Co., Cleveland, O.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Controls Corp., The, Detroit, Mich.
Fisher Governor Co., Marshalltown, Ia.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Chicago, Ill.
Kainer and Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., The. Chicago, Ill.
Mueller Co., Decatur, Ill.
Penn Controls, Inc., Goshen, Ind.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Squires Co., C. E., The, Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Watts Regulator Co., Lawrence, Mass.
White-Rodgers Electric Co., St. Louis, Mo.
Yula Water Heaters Inc., New York, N. Y.

REGULATORS, PRESSURE, LIQUID

Askania Regulator Co., Chicago, Ill.
Atlas Valve Co., Newark, N. J.
Automatic Control Co., St. Paul, Minn.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Bristol Co., The, Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Controller Co., Cleveland, O.
Cla-Val Co., Alhambra, Calif.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Eddington Metal Specialty Co., Eddington, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Healy Ruff Co., St. Paul, Minn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Johnson Service Co., Milwaukee, Wis.
Justus Steam Trap Co., Napanoch, N. Y.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Hamilton, O.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.

Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Monitor Controller Co., The, Boston, Mass.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Newark Controls Co., Bloomfield, N. J.
Norgren Co., C. A., Englewood, Colo.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
R-S Products Corp., Philadelphia, Pa.
Republic Flow Meters Co., Chicago, Ill.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Schade Valve Mfg. Co., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Squires Co., C. E., The, Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., The, Cleveland, O.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Tryco Products, Inc., Westfield, Mass.
United Electric Controls Co., Watertown, Mass.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
White-Rodgers Electric Co., St. Louis, Mo.
Williams Gauge Co., The, Pittsburgh, Pa. (Feed water)

REGULATORS, STATIC PRESSURE, AIR DUCT

Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Bristol Co., The, Waterbury, Conn.
Cash Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Coral Designs, Long Island City, N. Y.
Hays Corp., Michigan City, Ind.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Shallcross Controls, Inc., Milwaukee, Wis.

REGULATORS, TEMPERATURE

A-P Controls Corp., Milwaukee, Wis.
Acro Mfg. Co., The, Columbus, O.
Aerco Corp., Englewood, N. J.
American Instrument Co., Inc., Silver Spring, Md.
Atlas Valve Co. Newark, N. J.
Autempco Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Barber-Colman Co., Rockford, Ill.
Bell & Gossett Co., Morton Grove, Ill.
Bristol Co., The, Waterbury, Conn.
Burling Instrument Co., South Orange, N. J.
Cooper Co., Clark, Palmyra, N. J.
Crown Controls Co., Inc., New Bremen, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Controls Corp., The, Detroit, Mich.
Eastern Industries, Inc., New Haven Conn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Stacon Corp., Palisades Park, N. J.
Fenwal Inc., Ashland, Mass.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif.
Gleason-Avery, Inc., Auburn, N. Y.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hagan Corp., Pittsburgh, Pa.
Hart Mfg. Co., The, Hartford, Conn.
Hays Corp., Michigan City, Ind.
Heat Timer Corp., New York, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Keckley Co., O. C., Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
McAlear Mfg. Co., Chicago, Ill.
McCorkle Co., D. H., Berkeley, Calif.
McDonnell & Miliers, Inc., Chicago, Ill.
Mercoid Corp., Chicago, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Penn Controls, Inc., Goshen, Ind.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
R-S Products Corp., Philadelphia, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Spence Engineering Co., Inc., Walden, N. Y.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Squires Co., C. E., The, Cleveland, O.
Sterling, Inc., Milwaukee, Wis.
Superior Controls Co., Inc., Los Angeles, Calif.
Swartwout Co., The, Cleveland, O.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Thermac Co., Los Angeles, Calif.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Co., Chicago, Ill.
White Mfg. Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis, Mo.

RELAYS, ELECTRICAL

Advance Electric and Relay Co., Burbank, Calif.
Allen-Bradley Co., Milwaukee, Wis.
Allied Control Co., Inc., New York, N. Y.
American Gas Accumulator Co., Elizabeth, N. J. (time delay)
American Instrument Co., Inc., Silver Spring, Md.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Autempco Corp., New York, N. Y.
Automatic Electric Mfg. Co., Mankato, Minn.
Automatic Switch Co., Orange, N. J.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
B/W Controller Corp., Birmingham, Mich.
Barber-Colman Co., Rockford, Ill.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Clark Controller Co., Cleveland, O.
Consolidated Car Heating Co., Inc., Albany, N. Y.
Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer Inc., Milwaukee, Wis.
Detroit Controls Corp., The, Detroit, Mich.
Dormeyer Industries, Chicago, Ill.
Durakool, Inc., Elknart, Ind.
Edison, Inc., Thos. A., Instrument Div., West Orange, N. J.
Electro-Switch & Controls Inc., Culver City, Calif.
Ess Instrument Co., Bergenfield, N. J.
General Controls Co., Glendale, Calif.
General Electric Co. Apparatus Sales Div., Schenectady, N. Y.
Guardian Electric Mfg. Co. Chicago, Ill.
Hart Mfg. Co., The, Hartford, Conn.
H-B Instrument Co., Philadelphia, Pa.
Industrial Engineering Corp., Terre Haute, Ind.
Leach Relay Co., Los Angeles, Calif.
McCorkle Co., D. H., Berkeley, Calif.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Monitor Controller Co., The, Boston, Mass.
National Time & Signal Corp., Detroit, Mich.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
Potter & Brumfield Sales Co., Princeton, Ind.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
R-S Products Corp., Philadelphia, Pa.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Square D Co., Detroit, Mich.
Struthers-Dunn, Inc., Philadelphia, Pa.
Synchro-Start Products, Inc., Skokie, Ill.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Thrush & Co., H. A., Peru, Ind.

Triplex Heating Specialty Co., Inc., Peru, Ind.
Ward Leonard Electric Co., Mt. Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

RELAYS, PNEUMATIC

Bailey Meter Co., Cleveland, O.
Foxboro Co., Foxboro, Mass.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Moore Products Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.

RELIEF VALVES

See Valves, Relief

REPAIR CLAMPS

See Clamps, Pipe Repair

REPAIR PLUGS FOR TANKS

See Plugs, Repair, for Tanks

RESEATERS, VALVE

Chicago Specialty Mfg. Co., Chicago, Ill.
Economy Valve Seat Co., Chicago, Ill.
Independent Pneumatic Tool Co., Aurora, Ill.
Leavitt Machine Co., Orange, Mass.
Skinner Co., M. B., South Bend, Ind.
Standard Reseater Corp., New York, N. Y.

REVERSE REFRIGERATION CYCLE UNITS

See Units, Air Conditioning, Reverse Refrigeration Cycle

RINGS, PISTON, FOR COMPRESSORS

Delavan Mfg. Co., Des Moines, Ia.
Double Seal Ring Co., Fort Worth, Tex.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Perfect Circle Corp., Hagerstown, Md.
Piston Ring Div., Koppers Co., Inc., Baltimore, Md.
Sealed Power Corp., Muskegon, Mich.

RINGS, WELDING

All-State Welding Alloys Co., Inc., White Plains, N. Y.
Grinnell Co., Inc., Providence, R. I.
Midwest Piping & Supply Co., Inc., St. Louis, Mo.
Robvon Industries, Inc., Elizabeth, N. J.
Tube Turns, Inc., Louisville, Ky.
Wedge Protectors, Inc., Cleveland, O.

ROD, GAS WELDING

Air Reduction Sales Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Aluminum Co. of America, Pittsburgh, Pa.
American Brass Co., Waterbury, Conn.
American Steel & Wire Co., United States Steel Corp., Subsidiary, Cleveland, O.
Atlantic Steel Co., Atlanta, Ga.
Bridgeport Brass Co., Bridgeport, Conn.
Chemalloy Associates, Santee, Calif.
Crucible Steel Co. of America, New York, N. Y.
Dow Chemical Co., The, Midland, Mich.
Duraloy Co., Scottdale, Pa. (Stainless)
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
International Nickel Co., Inc., The, New York, N. Y.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Marquette Mfg. Co., Minneapolis, Minn.
Maurath, Inc., Cleveland, O.
Mir-O-Col Alloy Co., Los Angeles, Calif. (for hard facing)
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Page Steel & Wire Division of American Chain & Cable Co., Inc., Monessen, Pa.
Revere Copper and Brass, Incorporated, New York, N. Y.
Youngstown Sheet & Tube Co., Youngstown, O.

ROLLER BEARINGS

See Bearings, Roller

ROOF COOLERS

See Systems, Roof Spraying

ROOF SPRAYING SYSTEMS

See Systems, Roof Spraying

ROOF VENTILATORS

See Ventilators, Roof

ROOM HUMIDIFIERS

See Humidifiers, Unit, Room Type; and Units, Air Conditioning, Winter

ROOM THERMOSTATS

See Thermostats, Room or Wall

ROTARY PUMPS

See Pumps, Rotary

RUBBER BELTING

See Belting, Flat, Rubber

RUBBER PACKING

See Packing, Rubber and Synthetic

RUBBER PIPE

See Pipe, Hard Rubber

SADDLE VALVES

See Valves, Saddle

SAFETY VALVES

See Valves, Safety, Steam

SCAFFOLDS, PORTABLE

American Ladder & Scaffold Co., Miami, Fla.
Beaver Art Metal Corp., Ellwood City, Pa.
Up-Right Scaffolds, Berkeley, Calif.

SCALE CONTROL

See Devices, Electrolytic; Treatment, Steam System; Treatment, Water

SCALE REMOVAL, CHEMICAL SERVICE FOR

Anderson-Stolz Corp., Kansas City, Mo.
Aqua Electric Scale Control, Inc., Cleveland, O. (electric scale control)
Brown Electro Co., Oklahoma City, Okla. (electrolytic protector)
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Dearborn Chemical Co., Chicago, Ill.
Dowell Inc., Tulsa, Okla.
Evis Mfg. Co., San Francisco, Calif. (without chemicals)
Madden Corp., The, Chicago, Ill.
Oakite Products, Inc., New York, N. Y.
O'Brien Industries, Caldwell, N. J.

SCREENS, SUN REFLECTING

Ingersoll Products Div., Borg-Warner Corp., Chicago, Ill.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Kane Mfg. Corp., Kane, Pa.

SCREWS, SHEET METAL

Aluminum Co. of America, Pittsburgh, Pa.
American Screw Co., Willimantic, Conn.
Continental Screw Co., New Bedford, Mass.
Elco Tool & Screw Corp., Rockford, Ill.
Harper Co., H. M., Morton Grove, Ill.
Industrial Screw Co., Chicago, Ill.
Lamson & Sessions Co., Cleveland, O.
National Lock Co., Inc., Rockford, Ill.
Paine Co., Addison, Ill.
Parker-Kalon Corp., New York, N. Y.
Pheoll Mfg. Co., Chicago, Ill.
Rockford Screw Products Co., Rockford, Ill.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y
Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Shakeproof, Inc., Chicago, Ill.
Standard Pressed Steel Co., Jenkintown, Pa.
United States Register Co., Battle Creek, Mich.

SEALS, SHAFT, MECHANICAL

Crane Packing Co., Chicago, Ill.
Delavan Mfg. Co., Des Moines, Ia.
Felt Products Mfg. Co., Chicago, Ill.
Garlock Packing Co., Palmyra, N. Y.
Johns-Manville, New York, N. Y.
Morganite, Inc., Carbon Specialties Div., Long Island City, N. Y.
Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Rotary Seal Co., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Sealol Corp., Providence, R. I.
Syntron Co., Homer City, Pa.

SEAMLESS PIPE

See Pipe, Steel, Seamless

SEPARATORS, AIR

Adams Co., Inc., R. P., Buffalo, N. Y.
Air Conversion Research Corp., Chicago, Ill.
Air-Line Engineering Co., Mansfield, Ohio.
American District Steam Co., Inc., North Tonawanda, N. Y.
Anderson Co., V. D., The, Cleveland, O.
Armstrong Machine Works, Three Rivers, Mich.
Binks Mfg. Co., Chicago, Ill.
Bowser, Inc., Fort Wayne, Ind.
Centrifix Corp., Cleveland, O.
Clark Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
DeVilbiss Co., The, Toledo, O.
Dollinger Corp., Rochester, N. Y.
Electric Sprayit Co., The, Sheboygan, Wis.
Gasflux Co., Mansfield, O.
Hagan Corp., Pittsburgh, Pa.
Illinois Engineering Co., Chicago, Ill.
Johnson Corp., Three Rivers, Mich.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Kraissl Co., Inc., The, Hackensack, N. J.
Leavitt Machine Co., Orange, Mass.
Logan Engineering Co., Chicago, Ill.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Spencer Turbine Co., Hartford, Conn.
Spray Engineering Co., Somerville, Mass.
Strong,Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., The, Cleveland, O.
Trerice Co., H. O., Detroit, Mich.
Wright-Austin Co., Detroit, Mich.

SEPARATORS, FLANGE

Kraissl Co., Inc., The, Hackensack, N. J.
Williams & Co., J. H., Buffalo, N. Y.

SEPARATORS, STEAM AND OIL

Acme Industries, Inc., Jackson, Mich.
Adams Co., Inc., R. P., Buffalo, N. Y.
Air Conversion Research Corp., Chicago, Ill.
American District Steam Co., Inc., North Tonawanda, N. Y.
Aminco Refrigeration Products Co., Detroit, Mich.
Anderson Co., V. D., The, Cleveland, O.
Armstrong Co., Richard M., Westchester, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Centrifix Corp., Cleveland, O. (Gas and Vapor)
Cochrane Corp., Philadelphia, Pa.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Fisher Governor Co., Marshalltown, Ia.
Graver Water Conditioning Co., New York, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hoppes Mfg. Co., Inc., Springfield, O.
Illinois Engineering Co., Chicago, Ill.
Johnson Corp., The, Three Rivers, Mich.
Kaye & MacDonald, Inc., West Orange, N. J.
Kieley & Mueller, Inc., North Bergen, N. J.
Kraissl Co., Inc., The, Hackensack, N. J.
Morehead Mfg. Co., Detroit, Mich.
National Valve & Mfg. Co., Pittsburgh, Pa.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Sims Co., Erie, Pa.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong,Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., The, Cleveland, O.
Temprite Products Corp., Birmingham, Mich.
Thermix Corp., The, Greenwich, Conn.
Velan Engineering Co., Jersey City, N. J.
Vilter Mfg. Co., The, Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.
Warner Lewis Co., Tulsa, Okla.
Webster & Co., Warren, Camden, N. J.
Wilson Engineeering Corp., Chicago, Ill.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
Wright-Austin Co., Detroit, Mich.

SEWAGE EJECTORS

See Ejectors, Sewage

SEWAGE PUMPS

See Pumps, Sewage

SHAFT SEALS, MECHANICAL

See Seals, Shaft, Mechanical

SHAFTS, FLEXIBLE, PUSH-PULL, FOR CONTROL

Arens Controls, Inc., Evanston, Ill.
Mall Tool Co., Chicago, Ill.
Piezo Mfg. Corp., New York, N. Y.
Stow Mfg. Co., Binghamton, N. Y.

SHEARS, ELECTRICAL, PORTABLE

Black & Decker Mfg. Co., Towson, Md.
G. D. S. Machinery & Supply Co., Inc., New York, N. Y.
Independent Pneumatic Tool Co., Aurora, Ill.
M-M-A, Inc., Lancaster, Pa.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Skil Corp., Chicago, Ill.
Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.

SHEARS, POWER

Barth Mfg. Co., Milldale, Conn.
Bertsch & Co., Inc., Cambridge City, Ind.
Bliss Co., E. W., Detroit, Mich.
Buckeye Tools Corp., Dayton, O.
Buffalo Forge Co., Buffalo, N. Y.
Cincinnati Shaper Co., Cincinnati, O.
Cleveland Punch & Shear Works Co., Cleveland, O.
Diamond Machine Tool Co., Pico, Calif.
Dreis Co., Ltd., Edward J., San Carlos, Calif.
Excelsior Tool & Machine Co., East St. Louis, Ill.
Famco Machine Co., Kenosha, Wis.
Frederick Iron & Steel Inc., Frederick, Md.
H-A Mfg. Co., York, Pa.
Heartley Machine & Tool Co., Toledo, O.
Hendley & Whittemore, Beloit, Wis.
Kling Bros. Engineering Works, Chicago, Ill.
Libert Machine Co., Green Bay, Wis.
Marshalltown Mfg. Co., Marshalltown, Ia.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Peck, Stow & Wilcox Co., Southington, Conn.
Quickwork Div., Whiting Corp., Harvey, Ill.
St. Louis Tool Co., St. Louis, Mo.
Stamco Inc., New Bremen, Ohio
Whiting Corp., Harvey, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Wysong & Miles, Greensboro, N. C.

SHEARS AND SNIPS, HAND

Bartlett Mfg. Co., Detroit, Mich.
Beverly Shear Mfg. Co., Chicago, Ill.
Black & Decker Mfg. Co., Towson, Md. (electrically driven)
Bremil Mfg. Co., Erie, Pa.
Champion Blower & Forge Co., Lancaster, Pa.
Crescent Tool Co., Jamestown, N. Y.
Excelsior Tool & Machine Co., East St. Louis, Ill.
G. D. S. Machinery & Supply Co., Inc., New York, N. Y.
Henkel-Clauss Co., The, Fremont, O.
Kidder Mfg. Co., Inc., J. F., Burlington, Vt. (Angle)
Klenk's Aviation Snips, Wilmington, Del.
Niagara Machine & Tool Wks., Buffalo, N. Y.
O'Neil-Irwin Mfg. Co., Lake City, Minn.
Pacific Machine & Iron Wks., Tacoma, Wash.
Peck, Stow & Wilcox Co., Southington, Conn.
Snap-on Tools Corp., Kenosha, Wis.
Thor Tool & Die Co., San Leandro, Calif.
Viking Shear Co., Erie, Pa.
Whitney Mfg. Co., W. A., Rockford, Ill.
Whitney Metal Tool Co., Rockford, Ill.
Wiss & Sons Co., J., Newark, N. J.

SHEAVES

See Pulleys and Sheaves, for Belt Drives

SHEET METAL BRAKES

See Brakes, Sheet Metal

SHEET METAL DUCTS

See Ducts and Duct Fittings, Prefabricated

SHEET METAL FITTINGS

See Ducts and Duct Fittings, Prefabricated

SHEET METAL PUNCHES

See Punches, Sheet Metal

SHEET, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Fairmont Aluminum Co., Fairmont, W. Va.
Kaiser Aluminum & Chemical Corp., Oakland, Calif.
Revere Copper and Brass Inc., New York, N. Y.
Reynolds Metals Co., Louisville, Ky.

SHEETS, ALUMINUM COATED

Armco Steel Corp., Middletown, O.

SHEETS AND BOARD, NON-METALLIC, FOR DUCT CONSTRUCTION

Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Celotex Corp., The, Chicago, Ill.
Grant Wilson Inc., Chicago, Ill.
Johns-Manville, New York, N. Y.
Keasbey Co., Robert A.; New York, N. Y.
Keasbey & Mattison Co. Ambler, Pa.
Keystone Asphalt Products Co., Chicago, Ill
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Ruberoid Co., New York, N. Y.
Sall Mountain Co., Hamilton, O.
Technical Ply-Woods, Chicago, Ill.

SHEETS, CLAD

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Aluminum Co. of America, Pittsburgh, Pa.
American Cladmetals Co., Carnegie, Pa. (Copper clad steel and stainless clad copper)
American Nickeloid Co., Peru, Ill.
Follansbee Steel Corp., Pittsburgh, Pa.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Ingersoll Steel Div., Borg Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Lukens Steel Co. and Divisions. Coatsville, Pa.
Republic Steel Corp., Cleveland, O.
Wood Steel Co., Alan, Conshohocken, Pa.

SHEETS, COPPER

American Brass Co., Waterbury, Conn.
American Nickeloid Co., Peru, Ill. (Nickel and chromium plated),
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Hussey & Co., C. G., Div. Copper Range Co., Pittsburgh, Pa.
Inland Steel Products Co., Milwaukee, Wis.
New Haven Copper Co., The, Seymour, Conn.
Revere Copper and Brass, Inc., New York, N. Y.
Western Brass Mills, Metal, Div. of Olin Industries, Inc., East Alton, Ill. (Brass, bronze, phosphor bronze)

SHEETS, LEAD

Alpha Metals, Inc., Jersey City, N. J.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Division Lead Co., Chicago, Ill.
Eagle-Picher Co., Cincinnati, O.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Gardiner Metal Co., Chicago, Ill.
Illinois Zinc Co., Chicago, Ill.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Rochester Lead Wks., Rochester, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
Weirton Steel Co., Weirton, W. Va. (Alloy coated)

SHEETS, MAGNESIUM ALLOY

Dow Chemical Co., The, Midland, Mich.

SHEETS, METAL, WITH PROTECTIVE NON-METALLIC COATING

American Nickeloid Co., Peru, Ill.
American Steel Band Co., Pittsburgh, Pa.
Cheney Flashing Co., Trenton, N. J.
Plasteel Products Co., Washington, Pa.
Robertson Co., H. H., Pittsburgh, Pa.
Technical Ply-Woods, Chicago, Ill. (Metal and plywood)

SHEETS, NICKEL AND NICKEL ALLOY

American Nickeloid Co., Peru, Ill.
International Nickel Co., Inc., The, New York, N. Y.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Revere Copper and Brass Incorporated, New York, N. Y.
Western Brass Mills, Metals Div. of Olin Industries, Inc., East Alton, Ill.

SHEETS, STEEL, COPPER BEARING

Armco Steel Corp., Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co., (Sub. United States Steel Corp.), San Francisco, Calif.
Continental Steel Corp., Kokomo, Ind.
Follansbee Steel Corp., Pittsburgh, Pa.
Granite City Steel Co., Granite City, Ill.
Inland Steel Co., Chicago, Ill.
Lukens Steel Co. and Divisions, Coatesville, Pa.
Newport Steel Corp., Rolling Mill Div., Newport, Ky.
Niles Rolling Mill Div., Sharon Steel Corp., Niles, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Tennessee Coal, Iron & Railroad Co., United States Steel Corp. Subsidiary, Birmingham, Ala.
United States Steel Co., Pittsburgh, Pa.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Youngstown Sheet & Tube Co., Youngstown, O.

SHEETS, STEEL, GALVANIZED

Apollo Steel Co., Apollo, Pa.
Armco Steel Corp., Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Bethlehem Steel Co., Bethlehem, Pa.
Columbia Steel Co. (Sub. United States Steel Corp.), San Francisco Calif.
Continental Steel Corp., Kokomo, Ind.
Inland Steel Co., Chicago, Ill.
Newport Steel Corp., Rolling Mill Div., Newport, Ky.
Niles Rolling Mill Div., Sharon Steel Corp., Niles, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Tennessee Coal & Iron Div., United States Steel Corp., Birmingham, Ala.
United States Steel Co., Pittsburgh, Pa.
Weirton Steel Co., Weirton, W. Va.
Wheeling Steel Corp., Wheeling, W. Va.
Wood Steel Co., Alan, Conshohocken, Pa.

SHEETS, STEEL, GALVANNEALED

Berger Mfg. Div., Republic Steel Corp., Canton, O.
Continental Steel Corp., Kokomo, Ind.
Newport Steel Corp., Rolling Mill Div., Newport, Ky.
Niles Rolling Mill Div., Sharon Steel Corp., Niles, O.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
United States Steel Co., Pittsburgh, Pa.

SHEETS, STEEL, STAINLESS

Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
American Nickeloid Co., Peru, Ill.
Armco Steel Corp., Middletown, O.
Berger Mfg. Div., Republic Steel Corp., Canton, O.
Crucible Steel Co. of America, New York, N. Y.
Duriron Co. Inc., The, Dayton, O.
Eastern Stainless Steel Corp., Baltimore, Md.
Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
Jessop Steel Co., Washington, Pa.
Republic Steel Corp., Cleveland, O.
Sharon Steel Corp., Sharon, Pa.
Superior Steel Corp., Pittsburgh, Pa.
Tennessee Coal, Iron & Railroad Co., United States Steel Corp., Subsidiary, Birmingham, Ala.
United States Steel Co., Pittsburgh, Pa.
Universal Cyclops Steel Corp., Bridgeville, Pa.
Washington Steel Corp., Washington, Pa.

SHEETS, WROUGHT IRON

Byers Co., A. M., Pittsburgh, Pa.

SHEETS, ZINC

American Nickeloid Co., Peru, Ill. (Nickel and chromium plated)
American Zinc Products Div., Ball Brothers Co., Greencastle, Ind.
Belmont Smelting & Refining Wks., Inc., Brooklyn, N. Y.
Division Lead Co., Chicago, Ill.
Hegeler Zinc Co., Danville, Ill.
Illinois Zinc Co., Chicago, Ill.
Matthiessen & Hegeler Zinc Co., La Salle, Ill.
New Jersey Zinc Sales Co., New York, N. Y.

SHUTTERS

See Louvers and Shutters

SIGHT GLASSES

See Glasses, Sight, for Pipe Lines

SIGNALS, LIQUID LEVEL

See Alarms, Liquid Level

SIGNALS, TANK FILL

See Alarms, Liquid Level

SILENCERS FOR REDUCING COMPRESSOR INTAKE NOISE

Air-Maze Corp., Cleveland, O.

SLEEVE BEARINGS

See Bearings, Sleeve

SLEEVES, PIPE REPAIR

See Clamps, Pipe Repair

SLIME AND ALGAE CONTROL, WATER TREATMENT FOR

See Treatment, Water, for Slime and Algae Control

SMOKE ALARMS

See Alarms, Smoke

SMOKE ELIMINATORS

See Jets, Overfire Air, for Smoke Abatement

SMOKE GUNS

See Guns and Pots, Smoke and Smudge

SMUDGE POTS

See Guns and Pots, Smoke and Smudge

SNOW MELTING ANTI-FREEZE

See Compounds, Anti-Freeze

SOFTENERS, WATER

Alrose Chemical Co., Providence, R. I.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Anderson-Stolz Corp., Kansas City, Mo.
Belco Industrial Equipment Div., Inc., Paterson, N. J.
Cochrane Corp., Philadelphia, Pa.
Culligan Soft Water Institute, Northbrook, Ill.
Duro Co., Dayton, O.
Elgin Softener Corp., Elgin, Ill.
General Filter Co., Ames, Ia.
Homease Products Division, Paterson, N. J.
MacDermid Chemical Co., Bristol, Conn.
Myers & Bro. Co., F. E., The, Ashland, O.
Norwood Associated Engineers Inc., Springfield, Mass
Permutit Co., New York, N. Y.
Red Jacket Mfg. Co., Davenport, Ia.
● Refinite Corp., Omaha, Neb.
Research Products Corp., Madison, Wis.
Reynolds Shafier Co., Detroit, Mich.
Stover Water Softener Co., St. Charles, Ill.
Uniflow Mfg. Co., Erie, Pa
Warlo Corp., New York, N. Y.

SOLAR HEAT RESISTING SCREENS

See Screens, Sun Reflecting

SOLDER (SILVER), BRAZING ALLOYS, AND FLUXES

Air Reduction Sale Co., New York, N. Y.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allen Co., Inc., L. B., Chicago, Ill.
American Brass Co., Waterbury, Conn.
American Platinum Works, Newark, N. J.
Atkins Saw Div., Borg-Warner Corp., Indianapolis, Ind.
Baker & Co., Inc., Newark, N. J.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Chase Brass & Copper Co., Waterbury, Conn.
Division Lead Co., Chicago, Ill.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Handy & Harman, New York, N. Y.
Hardy, Inc., Charles, New York, N. Y.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Gas Appliance Co., Cedar Rapids, Ia
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Marquette Mfg. Co., Minneapolis, Minn.
Mueller Brass Co., Port Huron, Mich.
National Cylinder Gas Co., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Soldering Specialties Co., Summit, N. J.
Special Chemicals Corp., New York, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Wabash Mfg. Co., Chicago, Ill.

SOLDER (TIN-LEAD), AND FLUXES

Allen Co., Inc., L. B., Chicago, Ill.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Alpha Metals, Inc., Jersey City, N. J.
American Brass Co., Waterbury, Conn.
American Solder & Flux Co., Philadelphia, Pa.
Belmont Smelting & Refining Works, Inc., Brooklyn, N. Y.
Benson Co., Inc., Alex R., Hudson, N. Y.
Burnley Battery & Mfg. Co., North East, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Division Lead Co., Chicago, Ill.
du Pont de Nemours & Co., E. I., Grasselli Chemicals Dept., Wilmington, Del.
Eagle-Picher Co., Cincinnati, O.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Federated Metals Div., American Smelting & Refining Co., New York, N. Y.
Flemm Lead Co., Inc., Long Island City, N. Y.
Galv-Weld Products, Lima, O.
Gardiner Metal Co., Chicago, Ill.
Glaser Lead Co., Inc., Brooklyn, N. Y.
Hercules Chemical Co., Inc., New York, N. Y.
Industrial Service Laboratories, Milwaukee, Wis.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Johnson Foil Mfg. Co., The, St. Louis, Mo.
Kester Solder Co., Chicago, Ill.
Klauer Mfg. Co., Dubuque, Ia.
Lake Chemical Co., Chicago, Ill.
Lenk Mfg. Co., Boston, Mass.
Lissberger & Son, Inc., Marks, Long Island City, N. Y.
London Chemical Co., Chicago, Ill.
Merchant & Evans Co., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
National Lead Co., New York, N. Y.
Northwest Lead Co., Seattle, Wash.
Paul-Lewis Laboratories, Inc., Milwaukee, Wis.
Potts-Farrington Co., Philadelphia, Pa.
Powder Weld Process Co., The, Brooklyn, N. Y.
Proved Products Mfg. Co., San Fernando, Calif.
Rochester Lead Works, Inc., Rochester, N. Y.
Rotometals, Inc., San Francisco, Calif.
Ruby Chemical Co., Columbus, O.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Soldering Specialties Co., Summit, N. J.
Special Chemicals Corp., New York, N. Y.
Standard Rolling Mills, Inc., Brooklyn, N. Y.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn, N. Y.
Wolfe-Kote Co., Inc., Sheboygan, Wis.

SOLENOIDS AND SOLENOID COILS

Allen-Bradley Co., Milwaukee, Wis.
Automatic Switch Co., Orange, N. J.
Barber-Colman Co., Rockford, Ill.
B/W Controller Corp., Birmingham, Mich.
Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Cutler-Hammer, Inc., Milwaukee, Wis.
Dormeyer Industries, Chicago, Ill.
Essex Wire Corp., Ft. Wayne, Ind.
General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Hubbell Corp., Mundelein, Ill.
Jefferson Electric Co., Bellwood, Ill.
McQuay-Norris Mfg. Co., St. Louis, Mo.
National Acme Co., The, Cleveland, O.
Soreng Mfg. Co., Schiller Park, Ill.
Synchro-Start Products, Inc., Skokie, Ill.
Trombetta Solenoid Corp., Milwaukee, Wis.

SOLENOID VALVES

See Valves, Solenoid

SOOT BLOWERS

See Blowers, Soot

SOOT DESTROYERS

See Destroyers, Soot, Chemical

SOUND CONTROL FOR COOLING TOWERS

See Noise Elimination for Cooling Towers

SOUND INDICATORS

See Indicators, Sound Level

SPARGER NOZZLES

See Nozzles, Sparger, for Tank Heating

SPEED CHANGERS

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical

SPEED REDUCERS

See Reducers, Speed

SPIRAL PIPE

See Pipe, Spiral, Riveted and Welded

SPOT WELDERS

See Welders, Spot

SPRAY HUMIDIFIERS

See Humidifiers, Direct, Spray Head

SPRAY NOZZLES

See Nozzles, Spray

SPRAY PAINTING BOOTHS

See Booths, Painting, Spray

SPRINKLER HEADS

See Heads, Sprinkler

SPRINKLER SYSTEM CONTROLS

See Controls, Fire Protection Sprinkler System; Valves, Fire Protection Sprinkler System Control

STACKS AND CHIMNEYS, INDUSTRIAL, PREFABRICATED

Bigelow Co., The, New Haven, Conn.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Prat-Daniel Corp., South Norwalk, Conn.
Van-Packer Corp., Chicago, Ill.

STAINLESS STEEL PIPE

See Pipe, Steel, Stainless

STAINLESS STEEL SHEETS

See Sheets, Steel, Stainless

STANDS, PIPE VISE

American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Capewell Mfg. Co., Hartford, Conn.
Martin & Sons, H. P., Owensboro, Ky.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Western Wire Products Co., St. Louis, Mo.
Williams & Co., J. H., Buffalo, N. Y.

STAPLES FOR FASTENING TUBING

See Hangers and Supports, Pipe

STARTERS, MOTOR

See Controllers and Starters, Motor

STEAM BOOSTER COMPRESSORS

See Compressors, Steam Booster

STEAM ENGINES

See Engines, Steam

STEAM GENERATORS

See Boilers

STEAM JET HEATERS

See Heaters, Steam Jet, for Liquids

STEAM JET REFRIGERATION

See Compressors, Refrigerating, Steam Jet

STEAM PRESSURE REGULATORS

See Valves, Pressure Reducing and Regulating

STEAM PUMPS

See Pumps, Steam

STEAM SEPARATORS

See Separators, Steam and Oil

STEAM TRAPS

See Traps, Steam

STEEL PIPE

See Pipe, Steel

STEEL TUBE FITTINGS, FLARED

See Fittings, Steel Tube, Flared

STEEL TUBING

See Tubing, Steel

STEEL UNIONS

See Unions, Steel

STEEL VALVES

See Valves, Gate; and Valves, Globe

STERILIZING LAMPS

See Lamps, Sterilizing, for Duct Installation

STERILIZING UNITS

See Units, Sterilizing, Air

STOCKS AND DIES

American Pipe Tool Co., Chicago, Ill.
Armstrong Mfg. Co., Bridgeport, Conn.
Beaver Pipe Tools, Inc., Warren, O.
Capewell Mfg. Co., Hartford, Conn.
Champion Blower & Forge Co., Lancaster, Pa.
Crown Die & Tool Co., Chicago, Ill. (Pipe)
Erie Tool Wks., Erie, Pa.
Greenfield Tap & Die Corp., Greenfield, Mass.
Hollands Mfg. Co., Erie, Pa.
Nye Tool Co., Chicago, Ill.
Oster Mfg. Co., Cleveland, O.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Saunders Mfg. Co., Yonkers, N. Y.
Threadwell Tap & Die Co., Greenfield, Mass.
Toledo Pipe Threading Machine Co., Toledo, O.

STOKERS, INDUSTRIAL AND COMMERCIAL

61 to 1200 Lb per Hr

Allington & Curtis Mfg. Co., Saginaw, Mich. (For shavings, chips and sawdust)
American Coal Burner Co., Chicago, Ill.
American Engineering Co., Philadelphia, Pa.
Anchor Div., Stratton & Terstegge Co., Inc., New Albany, Ind.
Auburn Burner Co., Auburn, Ind.
Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
Automatic Firing Corp., St. Louis, Mo.
Babcock & Wilcox Co., New York, N. Y.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Canton Stoker Corp., Canton, O.
Carnes, Inc., John R., Lima, O.
Carpenter Heating & Stoker Co., Cleveland, O.
Central Rubber & Steel Corp., Findlay, O.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Detroit Stoker Co., Detroit, Mich.
Diamond Iron Works, Inc., Minneapolis, Minn.
Econocol Stoker Div. of Cotta Transmission Co., Rockford, Ill.
Eddy Stoker Corp., Chicago, Ill.
Erie City Iron Works, Erie, Pa.
Fire-King Stoker Co., Indianapolis, Ind.
Flynn & Emrich Co., Baltimore, Md.
Frederick Iron & Steel Inc., Frederick, Md.
Freeman Stoker Div., Illinois Iron & Bolt Co., Chicago, Ill.
Fuel Savers, Inc., Harrisburg, Pa.
General Machinery Co., Spokane, Wash.
Gross-Aire Mfg. Co., Overland, Mo.
Gunnite Foundries Corp., Rockford, Ill. (Screws)
Heating Assurance, Inc., Spokane, Wash.
Her-Born Engrg. & Mfg. Co., Sandusky, O.
Hershey Machine & Foundry Co., Motorstokor Div., Manheim, Pa.
Hoffman Combustion Engrg. Co., Detroit, Mich. (spreader type)
Holcomb & Hoke Mfg. Co., Inc., Indianapolis, Ind.
International Engineering Wks., Inc., Framingham, Mass.
Iron Fireman Mfg. Co., Cleveland, O.
Johnston & Jennings Co., Cleveland, O.
Kingston Products Corp., Kokomo, Ind.
Kol-Master Corp., Oregon, Ill.
Laclede Stoker Co., St. Louis, Mo.
Leffel & Co., James, Springfield, O.
Loyal Knight Stokers, Inc., Belleville, Ill.
Mallory Sales Co., Dolton, Ill.
Meyer Furnace Co., The, Peoria, Ill.
Muncie Gear Wks., Inc., Muncie, Ind.
National Steam Pump Co., Upper Sandusky, O.
Newcomb-Detroit Co., Detroit, Mich.
Northern Steel & Stoker Corp., Peoria, Ill.
Ormsby-Osterman, Inc., St. Louis, Mo.
OverSpred Stoker Co., Chicago, Ill.
Perfection Grate & Stoker Co., Springfield, Mass.
Plymouth Industries, Inc., Plymouth, Ind.
Rheem Mfg. Co., New York, N. Y.
Riley Stoker Corp., Worcester, Mass.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Scott-Newcomb, Inc., St. Louis, Mo.
Sinker-Davis Co., Indianapolis, Ind.
Steel Products Engineering Co., Springfield, O.
Sun-Fire Stoker Corp., New Albany, Ind.
U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
V. & E. Products, Inc., Schuylkill Haven, Pa.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whiting Fire Power Products Corp., Superior, Wis.
Whitty Co., Inc., Boston, Mass. (Bituminous)
Will-Burt Co., The, Orrville, O.

STONEWARE PIPE

See Pipe, Stoneware

STORAGE WATER HEATERS

See Heaters, Water, Steam, Storage

STRAINERS, PIPE LINE

Air Maze Corp., Cleveland, O.
Alco Valve Co., St. Louis, Mo.
American District Steam Co., Inc., North Tonawanda, N. Y.
Aminco Refrigeration Products Co., Detroit, Mich.
Andale Co., Philadelphia, Pa.
Anderson Co., V. D., The, Cleveland, O.
Armstrong Machine Wks., Three Rivers, Mich.
Barnes & Jones, Inc., Boston, Mass. (steam and water only)
Barrett, Haentjens & Co., Hazleton, Pa.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blackmer Pump Co., Grand Rapids, Mich.
Bowser, Inc., Fort Wayne, Ind.
Boylston Steam Specialty Co., Chicago, Ill.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Cashin Co., W. D., Boston, Mass.
Cee-Kleer Products Co., Cincinnati, O.
Clark Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Cuno Engineering Corp., Meriden, Conn.
Davis Regulator Co., Chicago, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
De Zurik Shower Co., Sartell, Minn.
Eddington Metal Specialty Co., Eddington, Pa.
Edward Valves, Inc., East Chicago, Ind.
Elliott Co., Jeannette, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Newark, N. J.
Foster Pump Works, Inc., Union, N. Y.
General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hays Mfg. Co., Erie, Pa.
Henry Valve Co., Melrose Park, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Illinois Engineering Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Kieley & Mueller, Inc., North Bergen, N. J.
Kinney Mfg. Co., Boston, Mass.
Kraissl Co., Inc., The, Hackensack, N. J.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Leslie Co., Lyndhurst, N. J.
Madden Brass Products Co., Chicago, Ill.
Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Monarch Mfg. Wks., Inc., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Long Island City, N. Y.
Newark Wire Cloth Co., Newark, N. J.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
OPW Corp., Cincinnati, O.
Phillips & Co., H. A., Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scientific Instrument Co., Detroit, Mich.
Sheffler-Gross Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Co., Bellwood, Ill.
Standard Machine & Mfg. Co., St. Louis, Mo.
Staples & Pfeiffer, San Francisco, Calif.
Sterling, Inc., Milwaukee, Wis.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., The, Cleveland, O.
Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Trimount Rotary Power Co., Dedham, Mass.
Tryco Products, Inc., Westfield, Mass.
Walworth Co., New York, N. Y.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Webster & Co., Warren, Camden, N. J.
Webster Electric Co., Racine, Wis. (For oil burners)
Winslow Engineering Co., Oakland, Calif.
Wright-Austin Co., Detroit, Mich.
Yarnall-Waring Co., Philadelphia, Pa.
Zurn Mfg. Co., J. A., Industrial Div., Erie, Pa.

STRAINERS, SUCTION, FOR AIR WASHERS

Bahnson Co., Winston-Salem, N. C.
Eddington Metal Specialty Co., Eddington, Pa.

STRESS RELIEVERS

See Preheaters and Stress Relievers, Electric, for Pipe Welds

STRIP HEATERS

See Heaters, Strip and Immersion, Electric

STRUCTURAL SHAPES

See Angles, Bars, Beams, Channels and Tees

STUD DRIVERS

See Drills, Powder Operated

STUD WELDERS

See Welders, Stud

SUCTION LINE HEAT EXCHANGERS

See Exchangers, Heat, Refrigerant Suction Line

SUMP PUMPS

See Pumps, Sump

SUPERHEATERS, PROCESS STEAM

Babcock & Wilcox Co., New York, N. Y.
Bell & Gossett Co., Morton Grove, Ill.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Combustion Engineering-Superheater, Inc., New York, N. Y.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Edge Moor Iron Works, Inc., Edge Moor, Del.
Ewing Mfg. Co., Oklahoma City, Okla.
Foster Wheeler Corp., New York, N. Y.
Selas Corp. of America, Philadelphia, Pa.
Springfield Boiler Co., Springfield, Ill.
Union Iron Works, Erie, Pa.
Wiegand Co., Edwin L., Pittsburgh, Pa.

SURFACE, FINNED, COOLING, BRINE

Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.
American Blower Corp., Detroit, Mich.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co., West Hartford, Conn.
Conditionaire Unit Co., Chicago, Ill.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, New York, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Murray Mfg. Co., D. J., Wausau, Wis.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, COLD WATER

Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co., West Hartford, Conn.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Conditionaire Unit Co., Chicago, Ill.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
G. & O. Mfg. Co., New Haven, Conn.
Governair Corp., Oklahoma City, Okla.
Griscom-Russell Co., The, New York, N. Y.
Hastings Air Conditioning Co., Hastings, Neb.

Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
Nesbitt, Inc., John J., Philadelphia, Pa.
Nevinger Mfg. Co., Inc., Greenville, Ill.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Pleasantaire Corp., Washington, D. C.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O
Refrigeration Engineering, Inc., Los Angeles, Calif
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rittling Corp., The, Hamburg, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa
Super-Cold Corp., Los Angeles, Calif.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Linden, N. J.
Wolverine Tube Div., Calumet & Hecla, Inc., Detroit, Mich.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE, FINNED, COOLING, DIRECT EXPANSION

Acme Industries, Inc., Jackson, Mich.
Aerofin Corp., Syracuse, N. Y.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Betz Corp., Hammond, Ind.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co., West Hartford, Conn.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Conditionaire Unit Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O
G. & O. Mfg. Co., New Haven, Conn.
Governair Corp., Oklahoma City, Okla.
Griscom-Russell Co., The, New York, N. Y.
Hastings Air Conditioning Co., Hastings, Neb.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Merchant & Evans Co., Philadelphia, Pa.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
Nevinger Mfg. Co., Inc., Greenville, Ill.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Pleasantaire Corp., Washington, D. C.
Refrigeration Appliances Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Super-Cold Corp., Los Angeles, Calif.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE, FINNED, HEATING, INDIRECT, FERROUS

Bayley Blower Co., Milwaukee, Wis.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co., West Hartford, Conn.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Conditionaire Unit Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, New York, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Marlo Coil Co., St. Louis, Mo.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
National Radiator Co., The, Johnstown, Pa.
New York Blower Co., Chicago, Ill.
Niagara Blower Co., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rigidbilt Inc., Chicago, Ill.
Rittling Corp., The, Hamburg, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Vulcan Radiator Co., Hartford, Conn.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

SURFACE, FINNED, HEATING, INDIRECT, NON-FERROUS

Aerofin Corp., Syracuse, N. Y.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
Bayley Blower Co., Milwaukee, Wis.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co., West Hartford, Conn.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Drayer-Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
G. & O. Mfg. Co., New Haven, Conn.
Governair Corp., Oklahoma City, Okla.
Griscom-Russell Co., The, New York, N. Y.
Hastings Air Conditioning Co., Hastings, Neb.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Marlo Coil Co., St. Louis, Mo.
McCord Corp., Detroit, Mich.
McQuay, Inc., Minneapolis, Minn.
Modine Mfg. Co., Racine, Wis.
Murray Mfg. Co., D. J., Wausau, Wis.
Nesbitt, Inc., John J., Philadelphia, Pa.
Niagara Blower Co., New York, N. Y.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rittling Corp., The, Hamburg, N. Y.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Super-Cold Corp., Los Angeles, Calif.
Super Radiator Corp., Minneapolis, Minn.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn.
Vulcan Radiator Co., Hartford, Conn.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Wing Mfg. Co., L. J., Linden, N. J.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

SURFACE THERMOSTATS

See Thermostats, Surface

SUSPENDED FURNACES

See Heaters, Air

SWING JOINTS

See Joints, Pipe, Flexible Swing and Revolving

SWITCHES, ELECTRICAL

Acro Mfg. Co., The, Columbus, O.
Adam Electric Co., Frank, St. Louis, Mo.
Aerotec Corp., The, Greenwich, Conn.
Allen-Bradley Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.

Automatic Switch Co., Orange, N. J.
Barber-Colman Co., Rockford, Ill.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Clark Controller Co., Cleveland, O.
Congress Fan & Electric Co., Daytona Beach, Fla.
Cooper Co., Clark, Palmyra, N. J.
Crise Mfg. Co., The, Columbus, O.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Delta-Star Electric Co., Div. of H. K. Porter Co., Inc., Chicago, Ill.
Electric Controller & Mfg. Co., Cleveland, O.
Electric Machinery Mfg. Co., Minneapolis, Minn.
Electro-Switch & Controls, Inc., Culver City, Calif.
Furnas Electric Co., Batavia, Ill.
General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Guardian Electric Mfg. Co., Chicago, Ill.
Hart Mfg. Co., Hartford, Conn.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., Chicago, Ill.
Micro Div. of Minneapolis-Honeywell Regulator Co., Freeport, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Monitor Controller Co., The, Boston, Mass.
Morse-Smith-Morse, Inc., Watertown, Mass.
National Acme Co., The, Cleveland, O.
Penn Controls, Inc., Goshen, Ind.
Pyle-National Co., The, Chicago, Ill.
Soreng Mfg. Co., Schiller Park, Ill.
Square D Co., Detroit, Mich.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Struthers-Dunn, Inc., Philadelphia, Pa.
Thermix Corp., The, Greenwich, Conn.
Tork Clock Co., Inc., Mount Vernon, N. Y.
Trumbull Dept., General Electric Co., Plainville, Conn.
Unimax Switch Div., W. L. Maxson Corp., New York, N. Y.
Ward Leonard Electric Co., Mount Vernon, N. Y.
Westinghouse Electric Corp., Pittsburgh, Pa.
White Mfg. Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

SWITCHES, FLOAT, REFRIGERATION

Alco Valve Co., St. Louis, Mo.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Clark Controller Co., Cleveland, O.
Frick Co., Waynesboro, Pa.
Magnetrol, Inc., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., The, Chicago, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Thermix Corp., The, Greenwich, Conn.

SWITCHES, FLOW

Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Coral Designs, Long Island City, N. Y.
Drying Systems, Inc., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
General Controls Co., Glendale, Calif.
Magnetrol, Inc., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Penn Controls, Inc., Goshen, Ind.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Thermix Corp., The, Greenwich, Conn.

SWITCHES, LIQUID LEVEL

Acro Mfg. Co., The, Columbus, O.
Alco Valve Co., St. Louis, Mo.
Allen-Bradley Co., Milwaukee, Wis.
Arrow-Hart & Hegeman Elect. Co., Hartford, Conn.
Automatic Control Co., St. Paul, Minn.
B/W Controller Corp., Birmingham, Mich.
Bennett Oil Co., Omaha, Neb.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Coral Designs, Long Island City, N. Y.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Controls Corp., The, Detroit, Mich.
Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Fischer & Porter Co., Hatboro, Pa.
Furnas Electric Co., Batavia, Ill.
General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hays Mfg. Co., Erie, Pa.
Healy Ruff Co., St. Paul, Minn.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Kenco, Inc., Lorain, O.
Kisco Boiler & Engineering Co., St. Louis, Mo.
Liquidepth Indicators, Inc., Long Island City, N. Y.
Magnetrol Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Monitor Controller Co., The, Boston, Mass.
Newark Controls Co., Bloomfield, N. J.
Penn Controls, Inc., Goshen, Ind.
Photoswitch, Inc., Cambridge, Mass.
Ripley Co., Inc., Middletown, Conn.
Schaub Engineering Co., Fred H., Chicago, Ill.
Soreng Mfg. Co., Schiller Park, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Stephens-Adamson Mfg. Co., Aurora, Ill.
Thermix Corp., The, Greenwich, Conn.
Westinghouse Electric Corp., Pittsburgh, Pa.

SWITCHES, MERCURY

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Durakool, Inc., Elkhart, Ind.
G. M. Mfg. Co., New York, N. Y.
General Controls Co., Glendale, Calif.
Mercoid Corp., Chicago, Ill.
Micro Div. of Minneapolis Honeywell Reg. Co., Freeport, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Newark Controls Co., Bloomfield, N. J.
Norwalk Valve Co., South Norwalk, Conn.
Westinghouse Electric Corp., Pittsburgh, Pa.

SWITCHES, PNEUMATIC

Automatic Control Co., St. Paul, Minn.
Foxboro Co., Foxboro, Mass.
Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.

SWITCHES, PRESSURE AND VACUUM

Aerotec Corp., The, Greenwich, Conn.
Allen-Bradley Co., Milwaukee, Wis.
Autempco Corp., New York, N. Y.
Automatic Control Co., St. Paul, Minn.
Barber-Colman Co., Rockford, Ill.
Barksdale Valves, Los Angeles, Calif.
Clark Controller Co., Cleveland, O.
Cook Electric Co., Chicago, Ill.
Cooper Co., Clark, Palmyra, N. J.
Coral Designs, Long Island City, N. Y.
Cutler-Hammer, Inc., Milwaukee, Wis.
Defender Instrument & Regulator Co., St. Louis, Mo.
Detroit Controls Corp., The, Detroit, Mich.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Furnas Electric Co., Batavia, Ill.
General Controls Corp., Glendale, Calif.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Giannini & Co., Inc., G. M., Pasadena, Calif.
H-B Instrument Co., Philadelphia, Pa.
Healy Ruff Co., St. Paul, Minn.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
McQuay-Norris Mfg. Co., St. Louis, Mo.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Monitor Controller Co., The, Boston, Mass.
Newark Controls Co., Bloomfield, N. J.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Ranco, Inc., Columbus, O.
Shallcross Controls, Inc., Milwaukee, Wis.
Soreng Mfg. Co., Schiller Park, Ill.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Square D Co., Detroit, Mich.
Thermix Corp., The, Greenwich, Conn.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Electric Co., St. Louis, Mo.

SWITCHES, TIME

Allen-Bradley Co., Milwaukee, Wis.
American Gas Accumulator Co., Elizabeth, N. J.
Autempco Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Automatic Electric Mfg. Co., Mankato, Minn.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Cooper Co., Clark, Palmyra, N. J.
Durakool, Inc., Elkhart, Ind.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Electric Switch & Controls, Inc., Culver City, Calif.
General Controls Corp., Glendale, Calif.

General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hansen Mfg. Co., Princeton, Ind. (timing motors and time machine)
Haydon Mfg. Co., Inc., Sub. General Time Instruments Corp., Torrington, Conn.
Heat Timer Corp., New York, N. Y.
Industrial Engineering Corp., Terre Haute, Ind.
International Register Co., Chicago, Ill.
Landis & Gyr, Inc., New York, N. Y.
Mercoid Corp., Chicago, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
National Time & Signal Corp., Detroit, Mich.
Paragon Electric Co., Two Rivers, Wis.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Photoswitch, Inc., Cambridge, Mass.
Precision Products, Inc., Tulsa, Okla.
Reliance Automatic Lighting Co., Racine, Wis.
Reynolds Electric Co., River Grove, Ill.
Rhodes, Inc., M. H., Hartford, Conn.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Sampsel Time Control, Inc., Spring Valley, Ill.
Sangamo Electric Co., Springfield, Ill.
Telechron, Inc., Ashland, Mass.
Time 'Trol Co., Great Neck, L. I., N. Y.
Tork Clock Co., Inc., Mount Vernon, N. Y.
Ward Leonard Electric Co., Mount Vernon, N. Y.
Webster & Co., Warren, Camden, N. J.
Westinghouse Electric Corp., Pittsburgh, Pa.
White-Rodgers Electric Co., St. Louis, Mo.
Zenith Electric Co., Chicago, Ill.

SWIVEL PIPE COUPLINGS

See Joints, Pipe, Flexible Swing and Revolving

SYSTEMS, COMBUSTION CONTROL

Ace Instrument Co., Inc., Brooklyn, N. Y.
Askania Regulator Co., Chicago, Ill.
Aurora Pump Co., Aurora, Ill.
Bailey Meter Co., Cleveland, O.
Bowser, Inc., Fort Wayne, Ind.
Bristol Co., Waterbury, Conn.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Canton Stoker Corp., Canton, O.
Cash Co., A. W., Decatur, Ill.
Cleveland Fuel Equipment Co., Cleveland, O.
Combustion Control Corp., Cambridge, Mass.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Defender Instrument & Regulator Co., St. Louis, Mo.
De-Tec-Tronic Laboratories, Inc., Chicago, Ill.
Engineer Co., New York, N. Y.
Ess Instrument Co., Bergenfield, N. J.
Fischer & Porter Co., Hatboro, Pa.
General Electric Co., Apparatus Dept., Schenectady, N. Y.
General Power Plant Corp., Ossining, N. Y.
Hagan Corp., Pittsburgh, Pa.
Hays Corp., Michigan City, Ind.
Illinois Engineering Co., Chicago, Ill.
Iron Fireman Mfg. Co., Cleveland, O.
Leahy Mfg. Co., Los Angeles, Calif.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
Republic Flow Meters Co., Chicago, Ill.
Selas Corp. of America, Philadelphia, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Stout & Sons, David, St. Louis, Mo.
Webster Engineering Co., Tulsa, Okla.

SYSTEMS, CONDENSATE RETURN

Acker Organization, Inc., W. M., Cleveland, O.
Advance Pump Co., Berkeley, Calif.
Aurora Pump Co., Aurora, Ill.
Barnes & Jones, Inc., Boston, Mass.
Cissell Mfg. Co., Inc., W. M., Louisville, Ky.
Dunham Co., C. A., Chicago, Ill.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
Johnson Corp., The, Three Rivers, Mich.
Lattner Mfg. Co., P. M., Cedar Rapids, Iowa
Orr & Sembower, Inc., Reading, Pa.
Roth Co., Roy E., Rock Island, Ill.
Sterling Engineering & Mfg Corp., Hyde Park, Mass.
Stout & Sons, David, St. Louis, Mo.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Templeton Bros., Hyde Park, Mass.
York-Shipley, Inc., York, Pa.

SYSTEMS, ELECTRIC PIPE HEATING

Fluid Systems, Inc., New Haven, Conn.
Haynes Div., Rodman H. Martin Co., Philadelphia, Pa.
Industrial Engineering & Equipment Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.

SYSTEMS, FIRE EXTINGUISHING, AND HEAT AND SMOKE DETECTORS

Allen Mfg. Co., W. D., Chicago, Ill.
C-O-Two Fire Equipment Co., Newark, N. J.
Cardox Corp., Chicago, Ill.
Edison, Inc., Thomas A., West Orange, N. J.
Grinnell Co., Inc., Providence, R. I.

SYSTEMS, HEATING, HIGH TEMPERATURE HOT WATER

Over 350 F

American Hydrotherm Corp., Long Island City, N. Y.
International Boiler Works, The, East Stroudsburg, Pa.
Ross Engineering Corp., J. O., New York, N. Y.

SYSTEMS, HEATING, HOT WATER

Baseline Mfg. Co., Minneapolis, Minn.
Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
General Heaters & Regulators Co., Chicago, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hook & Ackerman, Inc., New York, N. Y.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Preferred Utilities Mfg. Corp., New York, N. Y.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Sullivan Valve & Engineering Co., Butte, Mont.
Surface Combustion Corp., Toledo, O.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A. Peru, Ind.
Trane Co., The, La Crosse, Wis.
Triplex Heating Speciality Co., Inc., Peru, Ind.
Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, VACUUM

Anderson Products, Inc., Cambridge, Mass.
Barnes & Jones, Inc., Boston, Mass.
Cashin Co., W. D., Boston, Mass.
Dunham Co., C. A., Chicago, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Trane Co., The, La Crosse, Wis.
Webster & Co., Warren, Camden, N. J.
Whittington Pump & Engineering Corp., Indianapolis, Ind.

SYSTEMS, HEATING, VAPOR

American District Steam Co., Inc., North Tonawanda, N. Y.
Barnes & Jones, Inc., Boston, Mass.
Cashin Co., W. D., Boston, Mass.
Dunham Co., C. A., Chicago, Ill.
Gorton Heating Corp., Cranford, N. J.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Monash-Younker Co., Inc., Chicago, Ill.
Radiator Valve Co. of America, Philadelphia, Pa.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Trane Co., The, La Crosse, Wis.
Webster & Co., Warren, Camden, N. J.

SYSTEMS, HEATING, ZONE CONTROL

Autempco Corp., New York, N. Y.
Automatic Devices Co., Inc., Western Springs, Ill.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Barnes & Jones, Inc., Boston, Mass.
Bell & Gossett Co., Morton Grove, Ill.
Dunham Co., C. A., Chicago, Ill.
General Heaters & Regulators Co., Chicago, Ill.
Heat Timer Corp., New York, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
Sullivan Valve & Engineering Co., Butte, Mont.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.

Webster & Co., Warren, Camden, N. J.
Zone-Heat Regulator Co., Garrettsville, O.

SYSTEMS, HOT GAS DEFROSTING, FOR REFRIGERATION

Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Penn Controls, Inc., Goshen, Ind.
Tenney Engineering, Inc., Newark, N. J.
Vilter Mfg. Co., The, Milwaukee, Wis.

SYSTEMS, PROCESS HEATING, HIGH TEMPERATURE

American Hydrotherm Corp., Long Island City, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Dow Chemical Co., The, Midland, Mich.
Dravo Corp., Pittsburgh, Pa.
Drying Systems, Inc., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Haynes Div., Rodman H. Martin Co., Philadelphia, Pa.
Illinois Engineering Co., Chicago, Ill.
International Boiler Works, The, East Stroudsburg, Pa.
Mitchell & Co., Inc., W. K., Philadelphia, Pa.
Olson & Co., Arthur A., Canfield, O.
Parks-Cramer Co., Fitchburg, Mass.
Peabody Engineering Corp., New York, N. Y.
Ross Engineering Corp., J. O., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Selas Corp. of America, Philadelphia, Pa.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Struthers Wells Corp., Titusville, Pa.
Trane Co., The, La Crosse, Wis.
Trent, Inc., Philadelphia, Pa.
Wing Mfg. Co., L. J., Linden, N. J.

SYSTEMS, ROOF SPRAYING (FOR COOLING ROOFS)

April Showers Co., Inc., Washington, D. C.
Binks Mfg. Co., Chicago, Ill.
Marley Co., Inc., The, Kansas City, Kan.
Rockwood Spinkler Co., Worcester, Mass.
Ross Sprinkler Co., Pasadena, Calif.
Ruppright, Siegfried, Los Angeles, Calif.
Skinner Irrigation Co., Troy, O.
Spray Engineering Co., Somerville, Mass.
Spraying Systems Co, Bellwood, Ill.
Water Cooling Corp., New York, N. Y.

TAGS, VALVE, FOR IDENTIFYING VALVES

Meyer & Wenthe, Inc., Chicago, Ill.

TANK FITTINGS

See Fittings and Bushings, Fuel Oil Tank

TANK HEADS

See Parts, for Heating and Air Conditioning Equipment

TANKS, BLOWOFF

American District Steam Co., Inc., North Tonawanda, N. Y.
Bigelow Co., The, New Haven, Conn.
Buffalo Tank Corp., Newark, N. J.
Downingtown Iron Works, Downingtown, Pa.
Hoppes Mfg. Co., Inc., Springfield, O.
International Boiler Works Co., The, East Stroudsburg, Pa.
Koven & Bro., L. O., Inc., Jersey City, N. J.
Manitowoc Shipbuilding, Inc., Manitowoc, Wis.
Murray Iron Wks. Co., Burlington, Ia.
Quaker City Iron Wks., Philadelphia, Pa.
Richmond Engineering Co., Inc., Richmond, Va.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
Union Iron Works, Erie, Pa.
Wright-Austin Co., Detroit, Mich.

TANKS, EXPANSION, FOR HOT WATER HEATING SYSTEMS

American District Steam Co., Inc., North Tonawanda, N. Y.
Baseline Mfg. Co., Minneapolis, Minn.
Bell & Gossett Co., Morton Grove, Ill.
Biggs Boiler Works Co., E. Akron, O.
Birchfield Boiler, Inc., Tacoma, Wash.
Buffalo Tank Corp., Newark, N. J.
Caldwell Co., W. E., Louisville, Ky.
Case & Son Mfg. Co., W. A., Buffalo, N. Y
Copper Boiler & Heater Wks., Manitowoc, Wis.
Kehm Corp., The, Chicago, Ill.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Maysteel Products, Inc., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia.
Quaker City Iron Wks., Philadelphia, Pa.
Rheem Mfg. Co., New York, N. Y.
Richmond Engineering Co., Inc., Richmond, Va.
Scaife Co., Oakmont, Pa.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Western Blower Co., Seattle, Wash.
Wood Co., John, Conshohocken, Pa.
Wright-Austin Co., Detroit, Mich.

TANKS, PROCESS AND STORAGE

Alert Boiler & Mfg. Co., Detroit, Mich.
Aluminum Co. of America, Pittsburgh, Pa.
American Car & Foundry Co., New York, N. Y.
American District Steam Co., Inc., North Tonawanda, N. Y.
American Hard Rubber Co., New York, N. Y. (Rubber lined)
American Moistening Co., Providence, R. I.
American Shipbuilding Co., Cleveland, O.
Armco Drainage & Metal Products, Inc., Middletown, O
Bell & Gossett Co., Morton Grove, Ill.
Bigelow Co., New Haven, Conn.
Biggs Boiler Wks. Co., E. Akron, O.
Birchfield Boiler, Inc., Tacoma, Wash.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bros Boiler & Mfg. Co., Wm., Minneapolis, Minn.
Buffalo Tank Corp., Newark, N. J.
Caldwell Co., W. E., Louisville, Ky.
Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Chicago Bridge & Iron Co., Chicago, Ill.
Chicago Steel Tank Co., Chicago, Ill.
Cincinnati Metalcrafts Inc., Cincinnati, O.
Columbian Steel Tank Co., Kansas City, Mo.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Connery Construction Co., Philadelphia, Pa.
Copper Boiler & Heater Wks., Manitowoc, Wis.
Dahlquist Mfg. Co., Div. of Process Engineering Inc., Somerville, Mass.
Day Co., The, Minneapolis, Minn.
Devine Mfg. Co., Inc., J. P., Pittsburgh, Pa.
Dillon Steam Boiler Wks., Inc., D. M., Fitchburg, Mass.
Downingtown Iron Works, Downingtown, Pa.
Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Elastic Porcelain Lining Corp., Rochester, N. Y. (Tank linings)
Erie City Iron Wks., Erie, Pa.
Falstrom Co., Passaic, N. J.
Farrar & Trefts, Buffalo, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Frick Co., Waynesboro, Pa.
Gehri Co., Tacoma, Wash.
General Ceramics & Steatite Corp., Keasbey, N. J. (chemical stone ware & porcelain)
Gerstein & Cooper, Inc., South Boston, Mass.
Goodrich Co., B. F., Akron, O. (Rubber lined)
Graver Tank & Mfg. Co., Inc., East Chicago, Ind.
Haveg Corp., Newark, Del.
Heil Process Equipment Corp., Cleveland, Ohio
Hodge Boiler Works, East Boston, Mass.
Hoppes Mfg. Co., Inc., Springfield, O.
International Boiler Wks., The, East Stroudsburg, Pa.
Kaustine Co., Inc., Perry, N. Y.
Kirk & Blum Mfg. Co., Cincinnati, O.
Knight, Maurice A., Akron, O.
Kopperman & Sons, Joseph, Philadelphia, Pa.
Koven & Bro., Inc., L. O., Jersey City, N. J.
Lead Lined Iron Pipe Co., Wakefield, Mass.
Littleford Bros. Inc., Cincinnati, O.
Lumm Co., A. H., Toledo, O.
Manitowoc Shipbuilding, Inc., Manitowoc, Wis.
Maysteel Products, Inc., Milwaukee, Wis.
Meldon Industries Div., Tool Industries, Inc., Detroit, Mich.
Mesker Steel Corp., Geo. L., Evansville, Ind.
Murray Iron Wks. Co., Burlington, Ia.
National Metal Fabricators, Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Nooter Corp., St. Louis, Mo.
Norse Boiler Co., Inc., New Market, N. J.
Patterson-Kelley Co., Inc., The, East Stroudsburg, Pa.
Pittsburgh Plate Glass Co., Pittsburgh, Pa. (glass)
Quaker City Iron Wks., Philadelphia, Pa.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y
Richmond Engineering Co., Inc., Richmond, Va.
Roessing Mfg. Co., Pittsburgh, Pa.
Rosebraugh Co., W. W., Salem, Ore.
Roth Co., Roy E., Rock Island, Ill.
Santa Fe Tank & Tower Co., Los Angeles, Calif.
Scaife Co., Oakmont, Pa.
Sims Co., Erie, Pa.
Struthers Wells Corp., Titusville, Pa.
Terre Haute Boiler Works Co., Terre Haute, Ind.
Tippett & Wood, Phillipsburg, N. J.
U. S. Pipe & Mfg. Co., S. San Francisco, Calif.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Van Noordeen Co., E., Boston, Mass.
Walsh-Holyoke Steam Boiler Co., Holyoke, Mass.

Western Blower Co., Seattle, Wash.
Whitlock Mfg. Co., Hartford, Conn.
Wood Co., John, Conshohocken, Pa.

TAPE, INDUSTRIAL, ADHESIVE

Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Firestone Industrial Products Co., Akron, O.
Irvington Varnish & Insulator Co., Irvington, N. J.
Johns-Manville, New York, N. Y.
Minnesota Mining & Mfg. Co., St. Paul, Minn.
New York Belting & Packing Co., Passaic, N. J.
Owens-Corning Fiberglas Corp., Toledo, O.
Polyken Industrial Tape Dept., Bauer & Black, Div. of the Kendall Co., Chicago, Ill.
Products Research Co., Glendale, Calif.
Seamless Rubber Co., The, F.O.S. Industrial Tape Div., New Haven, Conn.
United States Rubber Co., New York, N. Y.

TAPS, PIPE

Capewell Mfg. Co., Hartford, Conn.
Continental Screw Co., New Bedford, Mass.
Crown Die & Tool Co., Chicago, Ill.
Greenfield Tap & Die Corp., Greenfield, Mass.
Landis Machine Co., Inc., Waynesboro, Pa.
Threadwell Tap & Die Co., Greenfield, Mass.

TEMPERATURE AND HUMIDITY CONTROLS

See Humidistats; Recorder-Controllers; Thermostats

TEMPERATURE RECORDERS

See Recorders, Temperature

TEMPERATURE REGULATORS

See Regulators, Temperature

TEMPLATES, DRAWING, PIPING

Dietzgen Co., Eugene, Chicago, Ill.

TEST CHAMBERS

See Chambers, Test, Controlled Temperature and Humidity

TESTERS, GAGE, DEAD WEIGHT

American Instrument Co., Inc., Silver Spring, Md.
Ashton Valve Co., Cambridge, Mass.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Dillon Co., Inc., W. C., Forest Park, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mansfield & Green, Cleveland, O.

TESTERS, LEAK, FOR PIPING AND VESSELS

Greer Hydraulics, Inc., Brooklyn, N. Y.

TESTERS, SMOKE

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Victory Engineering Corp., Union, N. J.

THERMOMETERS, INDICATING, INDUSTRIAL

Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Dillon Co., Inc., W. C., Forest Park, Ill.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Electrimatic Co., Sales Affiliate Jas. P. Marsh Corp., Skokie, Ill.
Equipoise Controls, Mount Vernon, N. Y.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
Garden City Instruments, Inc., Chicago, Ill.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hill, E. Vernon & Co., Chicago, Ill.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Leeds & Northrup Co., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marshalltown Mfg. Co., Marshalltown, Ia.
Moeller Instrument Co., Richmond Hill, N. Y.
Pacific Transducer Co., Los Angeles, Calif. (for surface temperatures)
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Preferred Utilities Mfg. Corp., New York, N. Y.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Rochester Mfg. Co., Rochester, N. Y.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

THERMOMETERS, INDICATING, REMOTE-READING

Bailey Meter Co., Cleveland, O.
Bristol Co., The, Waterbury, Conn.
Defender Instrument & Regulator Co., St. Louis, Mo.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Electrimatic Co., Sales Affiliate Jas. P. Marsh Corp., Skokie, Ill.
Fee & Stemwedel, Inc., Chicago, Ill.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marshalltown Mfg. Co., Marshalltown, Ia.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Moore Products Co., Philadelphia, Pa.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Penn Industrial Instrument Corp., Philadelphia, Pa.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Rochester Mfg. Co., Rochester, N. Y.
Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thompson Research & Mfg. Co., Davenport, Fla.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Weksler Themometer Corp., New York, N. Y.
Weston Electrical Instrument Corp., Newark, N. J.

THERMOMETERS, INDICATING, WALL

Bristol Co., The, Waterbury, Conn.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Electrimatic Co., Sales Affiliate Jas. P. Marsh Corp., Skokie, Ill.
Fee & Stemwedel, Inc., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
G. M. Mfg. Co., New York, N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
H-B Instrument Co., Philadelphia, Pa.
Hausman Mfg. & Sales Co., Chicago, Ill. (Indicates both temperature and humidity, showing comfort zone)
Hill, E. Vernon & Co., Chicago, Ill.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Moeller Instrument Co., Richmond Hill, N. Y.
Palmer Thermometers, Inc., Cincinnati (Norwood), O.
Philadelphia Thermometer Co., Philadelphia, Pa.
Precision Thermometer & Instrument Co., Philadelphia, Pa.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Sarco Co., Inc., New York, N. Y.
Scientific Instrument Co., Detroit, Mich.
Standard Thermometer, Inc., Boston, Mass.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thwing-Albert Instrument Co., Philadelphia, Pa.
Trerice Co., H. O., Detroit, Mich.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
Weksler Thermometer Corp., New York, N. Y. (Effective temperature indicator)
Weston Electrical Instrument Corp., Newark, N. J.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

THERMOMETERS, KATA

G. M. Mfg. Co., New York, N. Y.
Hill, E. Vernon & Co., Chicago, Ill.
Precision Thermometer & Instrument Co., Philadelphia, Pa.

THERMOSTATIC BELLOWS

See Bellows, Thermostatic and Metallic

THERMOSTATIC BI-METALS

See Bi-Metals, Thermostatic

THERMOSTATIC TRAPS

See Traps, Steam, Thermostatic

THERMOSTATS, DUCT TYPE

American District Telegraph Co., New York, N. Y.
Atlas Valve Co., Newark, N. J.
Autempco Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., South Orange, N. J.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif
Cooper Co., Clark, Palmyra, N. J.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J
Fenwal Inc., Ashland, Mass.
Johnson Service Co., Milwaukee, Wis.
Leslie Co., Lyndhurst, N. J.
McLarty Systems, Battle Creek, Mich.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Moeller Instrument Co., Richmond Hill, N. Y.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Smith Control & Instrument Corp., Palmyra, N. J.
Stevens Mfg. Co., Inc., Mansfield, O.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Thermac Co., Los Angeles, Calif.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
Wiegand Co., Edwin L., Pittsburgh, Pa.
White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, EFFECTIVE TEMPERATURE

Barber-Colman Co., Rockford, Ill.
Cooper Co., Clark, Palmyra, N. J.
Illinois Engineering Co., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Sarcotherm Controls, Inc., New York, N. Y.

THERMOSTATS, IMMERSION

Atlas Valve Co., Newark, N. J.
Autempco Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., South Orange, N. J.
Cam-Stat. Inc., Div. of The Paul Henry Co., Los Angeles, Calif
Cooper Co., Clark, Palmyra, N. J.
Detroit Controls Corp., The, Detroit, Mich.
Edison, Inc., Thomas A., Instrument Div., West Orange, N. J.
Fenwal Inc., Ashland, Mass.
General Controls Co., Glendale, Calif.
H-B Instrument Co., Philadelphia, Pa.
Hart Mfg. Co., Hartford, Conn.
Industrial Engineering Corp., Terre Haute, Ind.
Iron Fireman Mfg. Co., Cleveland, O.
Johnson Service Co., Milwaukee, Wis.
Leslie Co., Lyndhurst, N. J.
Mechanical Industries Production Co., Akron, O.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia Pa.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Philadelphia Thermometer Co., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Smith Control & Instrument Corp., Palmyra, N. J.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Superior Controls Co., Inc., Los Angeles, Calif.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Thermac Co., Los Angeles, Calif.
Thwing-Albert Instrument Co., Philadelphia, Pa.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
Vulcan Electric Co., Danvers, Mass.
White Mfg. Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.
Wilcolator Co., Elizabeth, N. J.

THERMOSTATS, RADIANT HEAT

Detroit Controls Corp., The, Detroit, Mich.
General Controls Co., Glendale, Calif.
Iron Fireman Mfg. Co., Cleveland, O.
Mercoid Corp., The, Chicago, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Thrush & Co., H. A., Peru, Ind.
White-Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, ROOM OR WALL

A-P Controls Corp., Milwaukee, Wis.
Acro Mfg. Co., The, Columbus, O.
Armstrong Machine Wks., Three Rivers, Mich.
Autempco Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Crown Controls Co., Inc., New Bremen, O.
Detroit Controls Corp., The, Detroit, Mich.
General Controls Co., Glendale, Calif.
Gleason-Avery, Inc., Auburn, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
Iron Fireman Mfg. Co., Cleveland, O.
Johnson Service Co., Milwaukee, Wis.
McCorkle Co., D. H., Berkeley, Calif.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
Roberson Co., L. N., Seattle, Wash.
Sampsel Time Control, Inc., Spring Valley, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Thrush & Co., H. A., Peru, Ind.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
White Mfg. Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, SURFACE

Autempco Corp., New York, N. Y.
Barber-Colman Co., Rockford, Ill.
Cam-Stat, Inc., Div. of The Paul Henry Co., Los Angeles, Calif.
Cooper Co., Clark, Palmyra, N. J.
Detroit Controls Corp., The, Detroit, Mich.
Fenwal Inc., Ashland, Mass.
General Controls Co., Glendale, Calif.
Hart Mfg. Co., Hartford, Conn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Industrial Engineering Corp., Terre Haute, Ind.
McCorkle Co., D. H., Berkeley, Calif.
Mechanical Industries Production Co., Akron, O.
Mercoid Corp., The, Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
Red Spot Electric Co., Tacoma, Wash.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Smith Control & Instrument Corp., Palmyra, N. J.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Stevens Mfg. Co., Inc., Mansfield, O.
Therm-O-Disc, Inc., Mansfield, O.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United Electric Controls Co., Watertown, Mass.
Westinghouse Electric Corp., Pittsburgh, Pa
White Mfg. Co., St. Paul, Minn.
White-Rodgers Electric Co., St. Louis, Mo.
Wiegand Co., Edwin L., Pittsburgh, Pa.

THERMOSTATS, TWO TEMPERATURE OR DUAL

Automatic Devices Co., Inc., Western Springs, Ill.
Barber-Colman Co., Rockford, Ill.
Burling Instrument Co., South Orange, N. J.
Detroit Controls Corp., The, Detroit, Mich.
General Controls Co., Glendale, Calif.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J
H-B Instrument Co., Philadelphia, Pa.
Illinois Engineering Co., Chicago, Ill.
Industrial Engineering Corp., Terre Haute, Ind.
Johnson Service Co., Milwaukee, Wis.
Mercoid Corp., The, Chicago, Ill.
Miller-Harris Instrument Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Minneapolis, Minn.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
Ranco, Inc., Columbus, O.

Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Sampsel Time Control, Inc., Spring Valley, Ill.
United Electric Controls Co., Watertown, Mass.
Vapor Heating Corp., Chicago, Ill.
White Rodgers Electric Co., St. Louis, Mo.

THERMOSTATS, WEATHER COMPENSATING

Automatic Devices Co., Inc., Western Springs, Ill.
Barber Colman Co., Rockford, Ill.
Crown Controls Co., Inc., New Bremen, O.
Detroit Controls Corp., The, Detroit, Mich.
Heat Timer Corp., New York, N. Y.
Illinois Engineering Co., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Miller-Harris Instrument Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Tallmadge, Webster, Systems, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
United Electric Controls Co., Watertown, Mass.
Webster & Co., Warren, Camden, N. J.
White-Rodgers Electric Co., St. Louis, Mo.

TIME SWITCHES

See Switches, Time

TOGGLE BOLTS

See Bolts, Toggle and Anchor

TONGS, PIPE

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Williams & Co., J. H., Buffalo, N. Y.

TOOLS (CHISELS, PLIERS, SCREW DRIVERS, ETC.)

Balmar Corp., Baltimore, Md. (disc grinder)
Barton Products, Inc., Defiance, O. (flexible shaft grinding wheel and wire brush)
Billings & Spencer Co., Hartford, Conn.
Birks-Mfg. Co., Meriden, Conn. (Pittsburgh lock seam opener)
Bonney Forge & Tool Works, Allentown, Pa.
Carlson & Sullivan, Monrovia, Calif. (steel tape rule for reading diameter)
Chisholm-Moore Co., Tonawanda, N. Y. (portable and stationary electric powered hoists)
Churchward Welding Accessories, Jack, North Haven, Conn. (sealing hammer)
Crescent Tool Co., Jamestown, N. Y.
Dreier Brothers, Chicago, Ill. (level for determining pitch of pipe)
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., Rockford, Ill
Harris, A. R., Hammond, Ind.
Hexdall Co., A. M., Morris, Ill. (Pittsburgh lock hammers, tee hammers, seam openers)
Ingersoll-Rand Co., New York, N. Y.
Interstate Sales Co., New York, N. Y. (Protractor for layout work and center-finder protractor; angle meters for pipe layout)
Lane Shur-Grip Tool Co., Chicago, Ill. (pliers)
Levow, David, New York, N. Y. (3 way clamp)
Lufkin Rule Co., Saginaw, Mich. (steel tapes and folding rules)
Lug-All Co., The, Wynnewood, Pa. (portable hoists)
Mall Tool Co., Chicago, Ill.
Markal Co., Chicago, Ill. (markers for hot surfaces)
Mid-States Welder Mfg. Co., Chicago, Ill. (heavy duty power saw and file)
Millers Falls Co., Greenfield, Mass.
Milwaukee Electric Tool Corp., Milwaukee, Wis. (portable electric screw drivers)
Misener Mfg. Co., Inc., Syracuse, N. Y. (Rotary hole saws)
Owens Co., H., Culver City, Calif. (pattern developer tool for sheet metal work)
Peck, Stow & Wilcox Co., Southington, Conn.
Pioneer Tool Co., Racine, Wis.
R C S Tool Sales Corp., Joliet, Ill. (reciprocating saw attachment)
Rawlplug Co., Inc., The, New York, N. Y. (drills for masonry)
Richmont, Inc., San Gabriel, Calif.
Rotary Concrete Drill Co., Pasadena, Calif. (Drill bits)
Salsbury Corp., Los Angeles, Calif. (air hammer)
Schild Mfg. Co., Dallas, Tex.
Snap-on Tools Corp., Kenosha, Wis.
Stanley Works, The, New Britain, Conn.
Thompson & Son Co., The, Henry G., New Haven, Conn.
Wasserlein Mfg. Co., Inc., Joliet, Ill. (soldering pliers for copper tubing)
Williams & Co., J. H., Buffalo, N. Y.

TOOLS, FLARING, FOR TUBING

Armstrong Bros. Tool Co., Chicago, Ill.
Bonney Forge & Tool Works, Allentown, Pa.
Capewell Mfg. Co., Hartford, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Duro Metal Products Co., Chicago, Ill.
Everhot Products Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Key Co., East St. Louis, Ill.
Madden Brass Products Co., Chicago, Ill.
Parker Appliance Co., The, Cleveland, O.
Penn Brass & Copper Co., Erie, Pa.
Sac Tool Mfg. Co., St. Louis, Mo.
Talon Tools, Inc., North Arlington, N. J.
Weatherhead Co., Cleveland, O.
Williams & Co., J. H., Buffalo, N. Y.
Wilson, Inc., Thomas C., Long Island City, N. Y.

TORCHES, BRAZING AND SOLDERING

Aeroil Products Co., Inc., South Hackensack, N. J.
Air Reduction Sales Co., New York, N. Y.
Bernz Co., Otto, Rochester, N. Y.
Borm Mfg. Co., Elgin, Ill.
Clayton & Lambert Mfg. Co., Louisville, Ky.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Ergolyte Mfg. Co., Philadelphia, Pa.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
General Scientific Equipment Co., Philadelphia, Pa.
Goss Gas, Inc., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
Ideal Industries, Inc., Sycamore, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Industrial Engineered Products Co., Los Angeles, Calif.
Industrial Gas Div., Liquid Carbonic Corp., Chicago, Ill.
Insto-Gas Corp., Detroit, Mich.
Johnson Gas Appliance Co., Cedar Rapids, Ia.
Lee Co., K. O., Aberdeen, S. D.
Lenk Mfg. Co., Boston, Mass.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Mass Co., Davenport, Ia.
Mid-States Welder Mfg. Co., Chicago, Ill.
Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Polis Mfg. Co., J. D., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Pressure Products Corp., Skokie, Ill.
Reiner & Campbell Co., Inc., Newark, N. J.
Research Vacuum Supply Co., Chicago, Ill.
Sac Tool Mfg. Co., St. Louis, Mo.
Sight Feed Generator Co., West Alexandria, O.
Smith Welding Equipment Corp., Minneapolis, Minn.
Torit Mfg. Co., St. Paul, Minn.
Trindl Products, Ltd., Chicago, Ill.
Turner Brass Works, The, Sycamore, Ill.
Velocity Power Tool Co., Pittsburgh, Pa.
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Will-Weld Mfg. Co., Inc., Omaha, Neb.

TORQUE INDICATING WRENCHES

See Wrenches, Torque Indicating

TOWERS, COOLING, ATMOSPHERIC

American Cooling Tower Co., Kansas City, Mo.
Binks Mfg. Co., Chicago, Ill.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Harry Cooling Towers, Inc., New York, N. J.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
Marley Co., Inc., Kansas City, Kan.
New England Cooling Tower Co., Boston, Mass.
Pennsylvania Engineering Wks., New Castle, Pa.
Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Santa Fe Tank & Tower Co., Los Angeles, Calif.
Stewart Ice Machine Co., Pomona, Calif.
United Cooling Tower Co., Kansas City, Mo.
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Co., St. Louis, Mo.
Water Cooling Tower Co., Chicago, Ill.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.

TOWERS, COOLING, MECHANICAL DRAFT

Acme Equipment Co., Muskogee, Okla.
Acme Industries, Inc., Jackson, Mich.
Air & Refrigeration Corp., New York, N. Y.
American Cooling Tower Co., Kansas City, Mo
Aqua-Therm, Inc., Dayton, O.

Baltimore Aircoil Co., Inc., Baltimore, Md
Beck Mfg. Co., New Albany, Ind.
Binks Mfg. Co., Chicago, Ill.
Buensod-Stacey, Inc., New York, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Crowell & Dunn, Inc., New York, N. Y.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer-Hanson, Inc., Los Angeles, Calif.
Fluor Corp., Ltd., The, Los Angeles, Calif.
Foster Wheeler Corp., New York, N. Y.
Goodfellow Co., E. D., Memphis, Tenn.
Governair Corp., Oklahoma City, Okla.
Halstead & Mitchell, Pittsburgh, Pa.
Harry Cooling Towers, Inc., New York, N. Y.
Havens Structural Steel Co., Kansas City, Mo.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Kramer-Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Lilie-Hoffmann Cooling Towers, Inc., St. Louis, Mo.
Marley Co., Inc., Kansas City, Kan.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Nevinger Mfg. Co., Inc., Greenville, Ill.
New England Cooling Tower Co., Boston, Mass.
Pennsylvania Engineering Wks., New Castle, Pa.
Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.
Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Reco Products Div., Refrigeration Engineering Corp., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Santa Fe Tank & Tower Co., Los Angeles, Calif.
Servel, Inc., Evansville, Ind.
Super-Cold Corp., Los Angeles, Calif.
Tenney Engineering, Inc., Newark, N. J.
Thermal Industries, San Francisco, Calif.
Trane Co., The, LaCrosse, Wis.
United Conditioning Corp., Croton Falls, N. Y.
United Cooling Tower Co., Kansas City, Mo.
United States Air Conditioning Corp., Minneapolis, Minn.
Vogt Machine Co., Henry, Louisville, Ky. (packaged unit with condenser, pump, etc.)
Water Cooling Corp., New York, N. Y.
Water Cooling Equipment Co., St. Louis, Mo.
Water Cooling Tower Co., Chicago, Ill.
Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
Young Radiator Co., Racine, Wis.

TOWERS, COOLING, NOISE ELIMINATION FOR

See Noise Elimination for Cooling Towers

TRANSFORMERS, ELECTRIC

Acme Electric Corp., Cuba, N. Y.
Arjac Products Inc., Rochester, N. Y.
Birdsell Mfg. Co., Inc., Palo Alto, Calif.
Crown Controls Co., Inc., New Bremen, O.
Dormeyer Industries, Chicago, Ill.
Eisler Engineering Co., Inc., Newark, N. J.
Essex Wire Corp., Ft. Wayne, Ind.
Fluid Systems, Inc., New Haven, Conn.
General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Hampton Electric Mfg. Co., Pittsburgh, Pa.
Homease Products Division, Paterson, N. J.
Jefferson Electric Co., Bellwood, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Rex Welder & Engineering Co., Kansas City, Mo.
Sola Electric Co., Chicago, Ill. (voltage regulating)
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Taylor-Winfield Corp., Warren, O.
Trindl Products, Ltd., Chicago, Ill.
Union Spring & Mfg. Co., Jersey City, N. J.
Wagner Electric Corp., St. Louis, Mo.
Webster Electric Co., Racine, Wis.
Westinghouse Electric Corp., Pittsburgh, Pa.

TRANSMISSION DRIVES

See Drives, Chain, Flat Belt and V-Belt

TRANSMITTERS, PRESSURE AND TEMPERATURE

Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Taylor Instrument Companies, Rochester, N. Y.

TRAPS, MAGNETIC, FOR REMOVING TRAMP IRON FROM PIPE LINES

Columbia Engineering Service Co., San Francisco, Calif.
Dings Magnetic Separator Co., Milwaukee, Wis.

TRAPS, STEAM, MECHANICAL

Acker Organization, Inc., W. M., Cleveland, O.
American District Steam Co., Inc., North Tonawanda, N. Y.
Anderson Co., V. D., The, Cleveland, O.
Armstrong Machine Wks., Three Rivers, Mich.
Bailey Co., Chas. M., San Francisco, Calif.
Barnes & Jones, Inc., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Boylston Steam Specialty Co., Chicago, Ill.
Burrows Mfg. Co., F. A. York, Pa.
Cashin Co., W. D., Boston, Mass.
Clark Mfg. Co., Cleveland, O.
Coe Mfg. Co., Painesville, O.
Crane Co., Chicago, Ill.
Cryer Trap & Valve Co., Inc., New York, N. Y.
Davis Engineering Corp., Elizabeth, N. J.
Dunham Co., C. A. Chicago, Ill.
Ellis Drier Co., Chicago, Ill.
Fisher Governor Co., Marshalltown, Ia.
Healy Ruff Co., St. Paul, Minn.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Illinois Engineering Co., Chicago, Ill.
Johnson Corp., The, Three Rivers, Mich.
Justus Steam Trap Co., Napanoch, N. Y.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Leavitt Machine Co., Orange, Mass.
Marsh Heating Equipment Co., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
McAuley Trap Co., Pittsburgh, Pa.
Milwaukee Valve Co., Milwaukee, Wis.
Monash-Younker Co., Inc., Chicago, Ill.
Morehead Mfg. Co., Detroit, Mich.
Nason Co., Clarkston, Mich.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Sarco Co., Inc., New York, N. Y.
Schaub Engineering Co., Fred H., Chicago, Ill.
Squires Co., C. E., Cleveland, O.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Sterling, Inc., Milwaukee, Wis.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond Co., Cleveland, O.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Templeton Bros., Hyde Park, Mass.
Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Velan Engineering Co., Jersey City, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Webster & Co., Warren, Camden, N. J.
Williams Gauge Co., The, Pittsburgh, Pa.
Wright-Austin Co., Detroit, Mich. (Combination)
Yarnall-Waring Co., Philadelphia, Pa.

TRAPS, STEAM, THERMOSTATIC

American District Steam Co., Inc., North Tonawanda, N. Y.
Barnes & Jones, Inc., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Cashin Co., W. D., Boston, Mass.
Cryer Trap & Valve Co., Inc., New York, N. Y.
Dunham Co., C. A., Chicago, Ill.
Haines & Co., Inc., William S., Div. Sellers Injector Corp., Philadelphia, Pa.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Illinois Engineering Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Monash-Younker Co., Inc., Chicago, Ill.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
Squires Co., C. E., The, Cleveland, O.
Sterling Engineering & Mfg. Corp., Hyde Park, Mass.
Sterling, Inc., Milwaukee, Wis.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Templeton Bros., Hyde Park, Mass.
Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Velan Engineering Co., Jersey City, N. J.
Webster & Co., Warren, Camden, N. J.

TREATMENT, FUEL OIL, TO PREVENT SLUDGE

Allen Co., Robert G., Mechanicsville, N. Y.
Alrose Chemical Co., Providence, R. I.
American Sand-Banum Co., Inc., New York, N. Y.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Bird-Archer Co., Philadelphia, Pa.

Black & White Chemical Co., New York, N. Y.
Celco Corp., New York, N. Y.
Elraco Engineering Co., Los Angeles, Calif.
Hercules Chemical Co., Inc., New York, N. Y.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
National Airoil Burner Co., Inc., Philadelphia, Pa.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
O'Brien Industries, Caldwell, N. J.
% Proportioneers, Inc. %, Providence, R. I.
Perolin Co., Inc., Chicago, Ill.
Radiator Specialty Co., Charlotte, N. C.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Utility Laboratory, Inc., Brooklyn, N. Y.
Warren Refining & Chemical Co., The, Cleveland, O.
Western Chemical Co., Kansas City, Mo.

TREATMENT, STEAM SYSTEM, TO INHIBIT CORROSION

Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Water Softener Co., Philadelphia, Pa.
American Well Wks., Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Apex All Weather Products, Chicago, Ill.
Aqua Electric Scale Control, Inc., Cleveland, O.
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird-Archer Co., Philadelphia, Pa.
Brown Electro Co., Oklahoma City, Okla.
Calgon, Inc., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Cambridge, Mass.
Carbide and Carbon Chemicals Div., Carbide & Carbon
  Corp., New York, N. Y.
Chemical Engineering Co., Dallas, Tex.
Chemical Solvent Co., Birmingham, Ala.
Cochrane Corp., Philadelphia, Pa.
Continental Products Co., Euclid, O.
Dearborn Chemical Co., Chicago, Ill.
Dixon Crucible Co., Joseph, Jersey City, N. J.
Elgin Softener Corp., Elgin, Ill.
Graver Water Conditioning Co., New York, N. Y.
Haering & Co., Inc., D. W., San Antonio, Tex.
Hercules Chemical Co., Inc., New York, N. Y.
Kenite Laboratory, Inc., Madison, N. J.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
McRay Sales Co., South Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milton Roy Co., Philadelphia, Pa.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
O'Brien Industries, Caldwell, N. J.
Perolin Co., Inc., Chicago, Ill.
% Proportioneers, Inc. %, Providence, R. I.
Research Products Corp., Madison, Wis.
Rid-Sludge Div., Aulwood Mfg. Co., St. Paul Minn. (vapor treatment
  to remove sludge from heating system)
Saverite Engineering Co., Hoboken, N. J.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Strong, Carlisle & Hammond Co., Cleveland, O.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Utility Laboratory, Inc., Brooklyn 32, N. Y.
Vinco Co., Inc., The, New York, N. Y.
Warren Refining & Chemical Co., Cleveland, O.
Water Treatment Co. of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
X Laboratories, Inc., New York, N. Y.

TREATMENT, WATER, TO INHIBIT CORROSION

Agava Products, Inc., Jersey City, N. J.
Allis-Chalmers Mfg. Co., Milwaukee, Wis.
American Cyanamid & Chemical Corp., New York, N. Y.
American K. A. T. Corp., Garwood, N. J.
American Sand Banum Co., Inc., New York, N. Y.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Aqua Electric Scale Control, Inc., Cleveland, O.
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird-Archer Co., Philadelphia, Pa.
Brown Electro Co., Oklahoma City, Okla.
Calgon, Inc., Pittsburgh, Pa.
Cannon Chemical Co., Inc., Cambridge, Mass.
Carbide and Carbon Chemicals Div., Carbide & Carbon
  Corp., New York, N. Y.
Chemical Engineering Co., Dallas, Tex.
Chemical & Metallurgical Products, Inc., New York, N. Y.
Chemical Solvent Co., Birmingham, Ala.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Culligan Soft Water Institute, Northbrook, Ill.
Dearborn Chemical Co., Chicago, Ill.
Drew & Co., Inc., E. F., New York, N. Y.
Elgin Softener Corp., Elgin, Ill.
Evis Mfg. Co., San Francisco, Calif.
Ferro-Nil Corp., New York, N. Y.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Fischer & Porter Co., Hatboro, Pa.
General Filter Co., Ames, Ia.
Graver Water Conditioning Co., New York, N. Y.
Grief, Edward C., Bogota, N. J.
Haering & Co., Inc., D. W., San Antonio, Tex.
Hagan Corp., Pittsburgh, Pa.
Homease Products Division, Paterson, N. J.
Hungerford & Terry, Inc., Clayton, N. J.
Layne & Bowler, Inc., Memphis, Tenn.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
Maintenance Engineering Corp., Houston, Tex.
McRay Sales Co., South Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milton Roy Co., Philadelphia, Pa.
Monsanto Chemical Co., St. Louis, Mo.
Moreheat Distribution, Inc., Cincinnati, O.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
O'Brien Industries, Caldwell, N. J.
%Proportioneers, Inc., %, Providence, R. I.
Permutit Co., New York, N. Y.
Perolin Co., Inc., Chicago, Ill.
Red Jacket Mfg. Co., Davenport, Ia.
Refinite Corp., Omaha, Nebr.
Research Products Corp., Madison, Wis.
Rodwell Engineering & Sales Co., Omaha, Neb.
Saverite Engineering Co., Hoboken, N. J.
Schror, Dr. Adolph, East Orange, N. J.
S. O. S. Products Co., Inc., Brooklyn, N. Y.
Strong, Carlisle & Hammond Co., Cleveland, O.
Sudbury Laboratory, South Sudbury, Mass.
Sulflo, Inc., Elizabeth, N. J.
Turco Products, Inc., Los Angeles, Calif.
Uniflow Mfg. Co., Erie, Pa.
Vinco Co. Inc., The, New York, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.
Warlo Corp., New York, N. Y.
Water Refining Co., Ft. Wayne, Ind.
Water Service Laboratories, Inc., New York, N. Y.
Water Treatment Company of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.
Worthington Corp., Harrison, N. J.
X Laboratories, Inc., New York, N. Y.

TREATMENT, WATER, FOR SLIME AND ALGAE CONTROL

Agava Products Inc., Jersey City, N. J.
Alrose Chemical Co., Providence, R. I.
American Sand-Banum Co., Inc. New York, N. Y.
American Water Softener Co., Philadelphia, Pa.
American Well Works, Aurora, Ill.
Ampion Corp., Long Island City, N. Y.
Anderson-Stolz Corp., Kansas City, Mo.
Aqua Electric Scale Control, Inc., Cleveland, O.
Aquatrol Laboratories, Inc., Clifton, N. J.
Bird-Archer Co., Philadelphia, Pa.
Brown Electro Co., Oklahoma City, Okla.
Carbide and Carbon Chemicals Div., Union Carbide and Carbon
  Corp., New York, N. Y.
Carolina Aniline & Extract Co., Charlotte, N. C.
Chemical Engineering Co., Dallas, Tex.
Chemical Solvent Co., Birmingham, Ala.
Cooper Co., Clark, Palmyra, N. J.
Dearborn Chemical Co., Chicago, Ill.
Drew & Co., Inc., E. F., New York, N. Y.
Evis Mfg. Co., San Francisco, Calif.
Filtrine Mfg. Co., Inc., Brooklyn, N. Y.
Fischer & Porter Co., Hatboro, Pa.
General Filter Co., Ames, Ia.
General Ozone Corp., Chicago, Ill.
Graver Water Conditioning Co., New York, N. Y.
Haering & Co., Inc., D. W., San Antonio, Tex.
Hagan Corp., Pittsburgh, Pa.
Homease Products Division, Paterson, N. J.
Hungerford & Terry, Inc., Clayton, N. J.
Layne & Bowler, Inc., Memphis, Tenn.
Madden Corp., The, Chicago, Ill.
Magnus Chemical Co., Garwood, N. J.
McRay Sales Co., South Pasadena, Calif.
Metropolitan Refining Co., Inc., Long Island City, N. Y.
Milton Roy Co., Philadelphia, Pa.
Monsanto Chemical Co., St. Louis, Mo.
National Aluminate Corp., Chicago, Ill.
North American Mogul Products Co., The, Cleveland, O.
Norwood Associated Engineers Inc., Springfield, Mass.
Oakite Products, Inc., New York, N. Y.
O'Brien Industries, Caldwell, N. J.
Perolin Co., Inc., Chicago, Ill.
% Proportioneers, Inc., %, Providence, R. I.
Permutit Co., New York, N. Y.
Refinite Corp., Omaha, Nebr.
Solvay Process Div., Allied Chemical & Dye Corp., New York, N. Y.
Wallace & Tiernan Co., Inc., Newark, N. J.
Water Treatment Co. of America, Pittsburgh, Pa.
Western Chemical Co., Kansas City, Mo.

TRY-COCKS, BOILER

Bailey Co., Chas. M., San Francisco, Calif.
Chicago Specialty Mfg. Co., Chicago, Ill.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Diamond Power Specialty Corp., Lancaster, O.
Eclipse Fuel Engineering Co., Rockford, Ill.
Huyette Co., Inc., Paul B., Philadelphia, Pa.
Keckley Co., O. C., Chicago, Ill.
Penberthy Injector Co., Detroit, Mich.
Reliance Gauge Column Co., Cleveland, O.
Robert Mfg. Co., Los Angeles, Calif.
Superior Controls Co., Inc., Los Angeles, Calif.

TUBE CLEANERS

See Cleaners, Tube

TUBES, BOILER

Babcock & Wilcox Tube Co., The, Tubular Products Div., Alliance, O.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Chase Brass & Copper Co., Waterbury, Conn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Globe Steel Tubes Co., Milwaukee, Wis.
H & H Tube & Mfg. Co., Detroit, Mich.
National Tube Div., United States Steel Co., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Standard Tube Co., Detroit, Mich.
Trent Tube Co., East Troy, Wis. (stainless)

TUBES, CONDENSER

American Brass Co., Waterbury, Conn.
Babcock & Wilcox Tube Co., The, Tubular Products Div., Alliance, O.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Bethlehem Steel Co., Bethlehem, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
Bundy Tubing Co., Detroit, Mich.
Chase Brass & Copper Co., Waterbury, Conn.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Globe Steel Tubes Co., Milwaukee, Wis.
National Tube Div., United States Steel Co., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Revere Copper and Brass Incorporated, New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Scovill Mfg. Co., Waterville Div., Waterville, Conn. (copper base)
Standard Tube Co., Detroit, Mich.
Timken Roller Bearing Co., Canton, O.
Trent Tube Co., East Troy, Wis. (stainless)
Warren Foundry & Pipe Corp., New York, N. Y.
Wolverine Tube Div., Calumet & Hecla, Inc., Detroit, Mich.
York Corp., York, Pa.

TUBES, PITOT

Defender Instrument and Regulator Co., St. Louis, Mo.
Dwyer Mfg. Co., F. W., Chicago, Ill.
Ellison Draft Gage Co., Chicago, Ill.
Foxboro Co., Foxboro, Mass.
Hill, E. Vernon & Co., Chicago, Ill.
Illinois Testing Laboratories, Inc., Chicago, Ill.
Meriam Instrument Co., The, Cleveland, O.
Taylor Instrument Companies, Rochester, N. Y.
Trimount Instrument Co., Chicago, Ill.

TUBING, ALUMINUM

Aluminum Co. of America, Pittsburgh, Pa.
American Brass Co., Waterbury, Conn.
Colonial Alloys Co., Metals Div., Philadelphia, Pa.
Penn Brass & Copper Co., Erie, Pa.
Revere Copper and Brass Incorporated, New York, N. Y.
Reynolds Metals Co., Louisville, Ky.
Shenango Agaloy Tube Co., Sharon, Pa.
Viking Copper Tube Co., Cleveland, O.
Wolverine Tube Div., Calumet & Hecla, Inc., Detroit, Mich.

TUBING BENDERS

See Benders, Tubing

TUBING, BRASS AND COPPER

American Brass Co., Waterbury, Conn. (copper/steel admiralty/steel)
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Everhot Products Co., Chicago, Ill.
H & H Tube & Mfg. Co., Detroit, Mich.
Helical Tube Corp., East Orange, N. J.
Hussey & Co., C. G., Div. Copper Range Co., Pittsburgh, Pa.
Keeney Mfg. Co., Newington, Conn. (Chrome plated)
Kensico Tube Co., Mt. Kisco, N. Y.
Lewin-Mathes Co., Lewin Metals Div., St. Louis, Mo.
Mueller Brass Co., Port Huron, Mich.
Penn Brass & Copper Co., Erie, Pa.
Phelps Dodge Copper Products Corp., British American Tube Div., New York, N. Y.
Reading Tube Corp., Long Island City, N. Y.
Revere Copper and Brass Incorporated, New York, N. Y.
Roberts Tube Works, Detroit, Mich.
Viking Copper Tube Co., Cleveland, O.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich.

TUBING, BRONZE

American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Helical Tube Corp., East Orange, N. J.
Revere Copper and Brass, Incorporated, New York, N. Y.

TUBING CUTTERS

See Cutters, Tubing

TUBING, DUPLEX

American Brass Co., Waterbury, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Pacific Tube Co., Los Angeles, Calif. (Non-ferrous to ferrous)
Republic Steel Corp., Steel & Tubes Div., Cleveland, O. (Steel and copper)

TUBING, FINNED

Aerofin Corp., Syracuse, N. Y.
American Coils Co., Newark, N. J.
Brown Fintube Co., The, Elyria, O.
Bush Mfg. Co. West Harford, Conn.
Chicago Fan & Fin Coil Co., Chicago, Ill.
Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Edwards Engineering Corp., Pompton Plains, N. J.
G. & O. Mfg. Co., New Haven, Conn.
Griscom-Russell Co., The, New York, N. Y.
Heat-X-Changer Co., Inc., The, Brewster, N. Y.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Kramer Trenton Co., Trenton, N. J.
McCord Corp., Detroit, Mich.
Merchant & Evans Co., Philadelphia, Pa.
Peerless of America, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rempe Co., Chicago, Ill.
Rome-Turney Radiator Co., Rome, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Tenney Engineering, Inc., Newark, N. J.
Thermek Sales Co., Whitewater, Wis. (spined)
Vapor Heating Corp., Chicago, Ill.
Wolverine Tube Div., Calumet and Hecla, Inc., Detroit, Mich (Aluminum, copper)
Young Radiator Co., Racine, Wis.

TUBING, MAGNESIUM

Dow Chemical Co., The, Midland, Mich.

TUBING METAL, FLEXIBLE

American Metal Hose Branch, American Brass Co., The, Waterbury, Conn.
Atlantic Metal Hose Co., Inc., New York, N. Y.
Johnson Metal Hose, Inc., Waterbury, Conn.
National Lead Co., New York, N. Y.
Packless Metal Hose, Inc., New Rochelle, N. Y.

TUBING, NICKEL AND NICKEL ALLOY

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Bridgeport Brass Co., Bridgeport, Conn.
Bundy Tubing Co., Detroit, Mich.
Globe Steel Tubes Co., Milwaukee, Wis.
Helical Tube Corp., East Orange, N. J.
International Nickel Co., Inc., The, New York, N. Y.
National Tube Div., United States Steel Co., Pittsburgh, Pa.
Pittsburgh Steel Co., Pittsburgh, Pa.
Revere Copper and Brass Incorporated, New York, N. Y.
Trent Tube Co., East Troy, Wis.

TUBING, PLASTIC

Acadia Synthetic Products Div., Western Felt Works, Chicago, Ill.
American Agile Corp., Cleveland, O.
American Hard Rubber Co., New York, N. Y.
Bolta Products, Inc., Lawrence, Mass.
Carlon Products Corp., Cleveland, O.
Commercial Plastics Co., Chicago, Ill.
Continental-Diamond Fibre Co., Newark, Del.
Extruded Plastics, Inc., Norwalk, Conn.

Flexible Tubing Corp., Guilford, Conn.
Gates Rubber Co., The, Denver, Colo.
General Ceramics & Steatite Corp., Keasbey, N. J
General Electric Co., Chemical Dept., Pittsfield, Mass.
Goodrich Co., B. F., Akron, O.
Goodyear Tire & Rubber Co., Akron, O.
Haveg Corp., Newark, Del.
Hudson Industries, Inc., Detroit, Mich.
Irvington Varnish and Insulator Co., Irvington, N. J.
Mills Corp., Elmer E., Chicago, Ill.
Pacific States Felt & Mfg. Co., Inc., San Francisco, Calif.
Panelyte Div., St. Regis Paper Co., New York, N. Y.
Reflin Co., Gardena, Calif.
Resistoflex Corp., Belleville, N. J.
Sandee Mfg. Co., Chicago, Ill.
Saran Lined Pipe Co., Ferndale, Mich.
Superior Tube Co., Norristown, Pa.
Triangle Conduit & Cable Co., Inc., New Brunswick, N. J.
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.
Yardley Plastics Co., Columbus, O.

TUBING, SILVER CLAD AND SILVER ALLOY

Baker & Co., Inc., Newark, N. J.
General Plate Div., Metals & Controls Corp., Attleboro, Mass.

TUBING, STEEL, ALLOY, SEAMLESS

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Div., United States Steel Co., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
Shenango Agaloy Tube Co., Sharon, Pa.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Superior Tube Co., Norristown, Pa.
Timken Roller Bearing Co., Canton, O.
Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, ALLOY, WELDED

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Tube Co., The, Beaver Falls, Pa.
Duraloy Co., Scottdale, Pa.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Shenango Agaloy Tube Co., Sharon, Pa.
Standard Tube Co., Detroit, Mich.
Trent Tube Co., East Troy, Wis.
Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, BRAZED

Bundy Tubing Co., Detroit, Mich.
Rochester Products, Div. of General Motors, Rochester, N. Y.
Shenango Agaloy Tube Co., Sharon, Pa.

TUBING, STEEL, SEAMLESS

Agaloy Tubing Co., Springfield, O.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Everhot Products Co., Chicago, Ill.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
National Tube Div., United States Steel Co., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Steel Co., Pittsburgh, Pa.
Shenango Agaloy Tube Co., Sharon, Pa.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Superior Tube Co., Norristown, Pa.
Timken Roller Bearing Co., Canton, O.
Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, STEEL, STAINLESS

Agaloy Tubing Co., Springfield, O.
Allegheny Ludlum Steel Corp., Pittsburgh, Pa.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Globe Steel Tubes Co., Milwaukee, Wis.
Helical Tube Corp., East Orange, N. J.
National Tube Div., United States Steel Co., Pittsburgh, Pa.
Pacific Tube Co., Los Angeles, Calif.
Pypon Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Shenango Agaloy Tube Co., Sharon, Pa.
Standard Tube Co., Detroit, Mich.
Superior Tube Co., Norristown, Pa.
Timken Roller Bearing Co., Canton, O.
Trent Tube Co., East Troy, Wis.
Tri-Clover Machine Co., Kenosha, Wis.

TUBING, STEEL, WELDED

Agaloy Tubing Co., Springfield, O.
Armco Steel Corp., Middletown, O.
Avon Tube Div., Higbe Mfg. Co., Rochester, Mich.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Babcock & Wilcox Tube Co., The, Tubular Products Div., Alliance, O.
Bundy Tubing Co., Detroit, Mich.
Everhot Products Co., Chicago, Ill.
Globe Steel Tubes Co., Milwaukee, Wis.
Jones & Laughlin Steel Corp., Pittsburgh, Pa.
Laclede Steel Co., St. Louis, Mo.
National Tube Div., United States Steel Co., Pittsburgh, Pa.
Nikoh Tube Co., Chicago, Ill.
Pacific Tube Co., Los Angeles, Calif.
Pittsburgh Tube Co., Pittsburgh, Pa.
Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Revere Copper and Brass Incorporated, New York, N. Y.
Rochester Products Div., Rochester, N. Y.
Sharon Steel Corp., Sharon, Pa.
Shenango Agaloy Tube Co., Sharon, Pa.
South Chester Tube Co., Chester, Pa.
Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Standard Tube Co., Detroit, Mich.
Thermapanels, Inc., San Jose, Calif.
Wheatland Steel Products Co., Philadelphia, Pa.
Wolverine Tube Div., Calumet & Hecla, Inc., Detroit, Mich.
Youngstown Sheet & Tube Co., Youngstown, O.

TUBING, TITANIUM

Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Superior Tube Co., Norristown, Pa.

TURBINES, MECHANICAL DRIVE

Carling Turbine Blower Co., Worcester, Mass.
Coppus Engineering Corp., Worcester, Mass.
Dean Hill Pump Co., Indianapolis, Ind.
De Laval Steam Turbine Co., Trenton, N. J.
Elliott Co., Jeannette, Pa.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Murray Iron Wks. Co., Burlington, Ia.
Pyle-National Co., The, Chicago, Ill.
Steam Turbine Div., Worthington Pump and Machinery Corp., Wellesville, N. J.
Terry Steam Turbine Co., Hartford, Conn.
Westinghouse Electric Corp., Pittsburgh, Pa.
Whiton Machine Co., New London, Conn.
Wing Mfg. Co., L. J., Linden, N. J.

2, 3 AND 4-WAY VALVES

See Valves, 2, 3 and 4-way

ULTRASONIC DUST AND FUME COLLECTION

See Collection, Dust and Fume, Ultrasonic

UNDERGROUND PIPING

See Conduit, Underground Piping

UNDERWATER HEATERS

See Heaters, Steam Jet, for Liquids

UNIONS, BRASS

Acheson Mfg. Co., Rankin, Pa.
Commonwealth Brass Corp., Detroit, Mich.
Crane Co., Chicago, Ill.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
General Fittings Co., Providence, R. I.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Mfg. Co., Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
King Union Co., Inc., Hillsgrove, R. I.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Phoenix Brass Fittings Corp., Irvington, N. J.
Powell Co., Wm., Cincinnati, O.
Rhode Island Fittings Co., Providence, R. I.
Union Metal Works, Chelsea, Mass.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Weatherhead Co., The, Cleveland, O.

UNIONS, MALLEABLE, BRASS SEAT

Corley Co., Inc., The, Jersey City, N. J.
Crane Co., Chicago, Ill.
Dart Union Co., E. M., Providence, R. I.
Das Div. of The Zeller Corp., Defiance, O.

Detroit Brass & Malleable Wks., Detroit, Mich.
Fairbanks Co., The, New York, N. Y.
Flagg & Co., Inc., Stanley G., Philadelphia, Pa.
General Fittings Co., Providence, R. I.
Grabler Mfg. Co., Cleveland, O.
Grinnell Co., Inc., Providence, R. I.
Illinois Malleable Iron Co., Chicago, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jefferson Union Co., Inc., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
King Union Co., Inc., Hillsgrove, R. I.
Malleable Iron Fittings Co., Branford, Conn.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Rhode Island Fittings Co., Providence, R. I.
Rockwood Sprinkler Co., Worcester, Mass.
Stockham Valves & Fittings, Birmingham, Ala.
Walworth Co., New York, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.

UNIONS, ORIFICE

Catawissa Valve & Fittings Co., Catawissa, Pa.
Conoflow Corp., Philadelphia, Pa.
Ladish Co., Cudahy, Wis.
Taylor Forge & Pipe Wks., Chicago, Ill.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

UNIONS, STEEL

Capitol Mfg. & Supply Co., Columbus, O.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Champion Machine & Forging Co., Cleveland, O.
Chiksan Co., Brea, Calif.
Crane Co., Chicago, Ill.
Dart Union Co., E. M., Providence, R. I.
Das Div. of The Zeller Corp., Defiance, O.
Fairbanks Co., The, New York, N. Y.
Frick Co., Waynesboro, Pa.
Gilbert Brass Foundry Co., St. Louis, Mo.
Grinnell Co., Inc., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (Stainless steel and alloy only)
Henry Valve Co., Melrose Park, Ill.
Rockwood Sprinkler Co., Worcester, Mass.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.

UNIT COOLERS

See Coolers, Unit

UNIT HEATERS

See Heaters, Unit

UNIT VENTILATORS

See Ventilators, Unit

UNITS, AIR CONDITIONING, FOR AUTOMOBILES

Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Frigidaire Div., General Motors Corp., Dayton, O.
Kool-Kar Co., Inc., Detroit, Mich.

UNITS, AIR CONDITIONING, BUS, TRUCK AND TRAILER

McGraw Electric Co., Clark Div., Chicago, Ill.
Trane Co., The, La Crosse, Wis.
U. S. Thermo Control Co., Minneapolis, Minn.
Waukesha Motor Co., Waukesha, Wis.

UNITS, AIR CONDITIONING, CENTRAL STATION TYPE

Self contained blower, heating and/or cooling coil, filter, humidifier unit for remote location and duct air distribution

Air & Refrigeration Corp., New York, N. Y.
Alton Mfg. Co., Dallas, Tex.
American Blower Corp., Detroit, Mich.
American Coils Co., Newark, N. J.
American Cooling Tower Co., Kansas City, Mo.
American Moistening Co., Providence, R. I.
American Thermal Industries, Inc., Detroit, Mich.
Anetsberger Bros., Inc., Northbrook, Ill.
Bahnson Co., Winston-Salem, N. C.
Baker Refrigeration Corp., South Windham, Me.
Blazer, M. & Son, Passaic, N. J.
Brunner Mfg. Co., Utica, N. Y.
Bryant Heater Div., Affiliated Gas Equipment Co. Inc., Cleveland, O.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clarage Fan Co., Kalamazoo, Mich.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer-Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Russell R., Cincinnati, O.
Governair Corp., Oklahoma City, Okla.
Hastings Air Conditioning Co., Hastings, Neb.
Howe Ice Machine Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Lennox Furnace Co., Marshalltown, Ia.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Meyer Furnace Co., The, Peoria, Ill.
Nevinger Mfg. Co., Inc., Greenville, Ill.
Niagara Blower Co., New York, N. Y.
Palmer Mfg. Corp., Phoenix, Ariz.
Parks-Cramer Co., Fitchburg, Mass.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Servel, Inc., Evansville, Ind. (absorption type)
Sterling Air Conditioning Corp., Washington, D. C.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
Yates-American Machine Co., Beloit, Wis.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, HORIZONTAL PACKAGE TYPE

Self contained blower, cooling and/or heating coil, filter, humidifier unit for ceiling or platform location in space conditioned, for connection to remote compressor or cold water supply, and steam or hot water

Air & Refrigeration Corp., New York, N. Y.
American Thermal Industries, Inc., Detroit, Mich.
Baker Refrigeration Corp., South Windham, Me.
Blazer, M., & Son, Passaic, N. J.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clarage Fan Co., Kalamazoo, Mich.
Conditionaire Unit Co., Chicago, Ill.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer-Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Russell R., Cincinnati, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Governair Corp., Oklahoma City, Okla.
Hastings Air Conditioning Co., Hastings, Neb.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Lipman Refrigeration Div., Yates American Machine Co., Beloit, Wis.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Nevinger Mfg. Co., Inc., Greenville, Ill.
Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
Refrigeration Appliances Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Super-Cold Corp., Los Angeles, Calif.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, La Crosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, INDUSTRIAL TYPE

Air & Refrigeration Corp., New York, N. Y.
American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Thermal Industries, Inc., Detroit, Mich.
Anetsberger Bros., Inc., Northbrook, Ill.
Baker Refrigeration Corp., South Windham, Me.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blazer, M., & Son, Passaic, N. J.
Buffalo Forge Co., Buffalo, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carbide & Carbon Chemicals Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Carrier Corp., Syracuse, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo.
Drayer-Hanson, Inc., Los Angeles, Calif.
Drying Systems, Inc., Chicago, Ill.
Economy Equipment Co., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Russell R., Cincinnati, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Governair Corp., Oklahoma City, Okla.
Haertel Co., Walter, Minneapolis, Minn.
Howe Ice Machine Co., Chicago, Ill.
Industrial Mfg. & Engineering Co., Chicago, Ill.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
King Co., The, Owatonna, Minn.
Kramer Trenton Co., Trenton, N. J.
Larkin Coils, Inc., Atlanta, Ga.
Lintern Corp., Painesville, O.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Nevinger Mfg. Co., Inc., Greenville, Ill.
New York Blower Co., Chicago, Ill. (Make-up air units)
Niagara Blower Co., New York, N. Y.
Parks-Cramer Co., Fitchburg, Mass.
Pfening Co., Fred D., Columbus, O.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Refrigeration Engineering, Inc., Los Angeles, Calif.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Rempe Co., Chicago, Ill.
Rigidbilt Inc., Chicago, Ill.
Rinehart Inc., Richmond, Ind.
St. Louis Blow Pipe & Heater Co., Inc., St. Louis, Mo.
Somers, Inc., H. J., Detroit, Mich.
Super-Cold Corp., Los Angeles, Calif.
Surface Combustion Corp., Toledo, O.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn.
Vilter Mfg. Co., Milwaukee, Wis.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.
Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, REVERSE REFRIGERATION CYCLE

Acme Industries, Inc., Jackson, Mich.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Muncie Gear Works, Inc., Muncie, Ind.
Northwest Heating, Inc., Portland, Ore.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Webber Engineering Corp., Indianapolis, Ind.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, EVAPORATIVE COOLING TYPE

For cooling by evaporation, no dehumidification

Air Equipment Co., Denver, Colo.
Air & Refrigeration Corp., New York, N. Y.
Alton Mfg. Co., Dallas, Tex.
American Blower Corp., Detroit, Mich.
American Cooling Tower Co., Kansas City, Mo.
American Moistening Co., Providence, R. I.
Aqua-Mist Co., Topeka, Kans.
Auburn Foundry, Inc., Stoker Div., Auburn, Ind.
Bahnson Co., Winston-Salem, N. C.
Barwick Mfg. Corp., Wichita, Kan.
Buensod-Stacey, Inc., New York, N. Y.
Campbell Co., E. K., Kansas City, Mo.
Carrier Corp., Syracuse, N. Y.
Central States Mfg. Co., Inc., Arkansas City, Kan.
Climax Machinery Co., Indianapolis, Ind.
Comfort Products Corp., Dallas, Tex.
Drayer-Hanson, Inc., Los Angeles, Calif.
Essick Mfg. Co., Los Angeles, Calif.
Farr Co., Los Angeles, Calif.
Great National Air Conditioning Corp., Oklahoma City, Okla.
Heating Assurance, Inc., Spokane, Wash.
International Metal Products Co., Phoenix, Ariz.
Kool-Sleep, Inc., Cambridge, O.
Lennox Furnace Co., Marshalltown, Ia.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla. (vaporizers and pumps for evaporative coolers)
Martin Fan & Blower Co., Chicago, Ill.
Mefco Mfg. Co., Air Conditioning Div., Glendale, Calif.
Montag Stove & Furnace Works, Portland, Ore.
Morey, Dan, Los Angeles, Calif. (aspen fiber replacement mats)
Mountain States Equipment Co., Denver, Colo.
National Engineering & Mfg. Co., Kansas City, Mo.
National Gas Equipment Co., Inc., Terrell, Tex.
Ohio Foundry & Mfg. Co., Steubenville, O.
Palmer Mfg. Co., Phoenix, Ariz.
Polaire Cooler Co., Inc., El Mirage, Ariz.
Rheem Mfg. Co., New York, N. Y.
Rhode Island Humidifier & Ventilating Co., Boston, Mass.
United Electric Service Co., Wichita Falls, Tex.
Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
X L Refrigerating Co., Chicago, Ill.
Young Radiator Co., Racine, Wis.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, REMOTE COMPRESSOR OR COLD WATER, UNDER 3 TONS CAPACITY

Self contained blower, coil, filter unit for connection to remote compressor or cold water supply

Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Drayer-Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Hastings Air Conditioning Co., Hastings, Neb.
International Mfg. Co., Oklahoma City, Okla.
Jaden Mfg. Co., Hastings, Neb.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
McQuay, Inc., Minneapolis, Minn.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Nat Corp., Kansas City, Mo.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O.
Rinehart Inc., Richmond, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
Temp-Control Inc., Peoria, Ill.
Trane Co., The, La Crosse, Wis.
United Conditioning Corp., Croton Falls, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, ROOM TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, UNDER 3 HP

Self contained blower, coil, compressor, filter unit

Automatic Firing Corp., St. Louis, Mo.
Baker Refrigeration Corp., South Windham, Me.
Brunner Mfg. Co., Utica, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Crosley Div., Avco Mfg. Corp., Cincinnati, O.
Fedders-Quigan Corp., Buffalo, N. Y.
General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
Hotpoint Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Marlo Coil Co., St. Louis, Mo.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Muntz TV, Inc., Chicago, Ill.
Nat Corp., Kansas City, Mo.
Philco Corp., Philadelphia, Pa.
RCA Victor Div., Radio Corp. of America, Camden, N. J.
Rinehart Inc., Richmond, Ind.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Scott-Newcomb, Inc., St. Louis, Mo.
Servel, Inc., Evansville, Ind.
Sutton Corp., O. A., The, Wichita, Kan.
United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, SUMMER, STORE TYPE, FLOOR CABINET, SELF CONTAINED COMPRESSOR, 3 HP AND OVER

Self contained blower, coil, compressor, filter unit with air discharge approximately 6 ft above floor

American Coils Co., Newark, N. J.
American Thermal Industries, Inc., Detroit, Mich.
Automatic Firing Corp., St. Louis, Mo.
Baker Refrigeration Corp., South Windham, Me.
Brunner Mfg. Co., Utica, N. Y.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clarage Fan Co., Kalamazoo, Mich.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo
Frick Co., Waynesboro, Pa.
Frigidaire Div., General Motors Corp., Dayton, O.
Governair Corp., Oklahoma City, Okla.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Mueller Furnace Co., L. J., Milwaukee, Wis.
Nat Corp., Kansas City, Mo.
Nevinger Mfg. Co., Inc., Greenville, Ill.
Rinehart Inc., Richmond, Ind.
Scott-Newcomb, Inc., St. Louis, Mo.
Servel, Inc., Evansville, Ind. (absorption type)
Sterling Air Conditioning Corp., Washington, D. C.
Trane Co., The, LaCrosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
United Conditioning Corp., Croton Falls, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, WINTER, ROOM TYPE, FLOOR CABINET

Self contained blower, filter, heating coil, humidifier unit

Air & Refrigeration Corp., New York, N. Y.
Aladdin Heating Corp., Oakland, Calif.
American Coils Co., Newark, N. J.
Auburn Burner Co., Auburn, Ind.
Baker Refrigeration Corp., South Windham, Me.
Bryant Industrial Div., Affiliated Gas Equipment Co., Inc., Cleveland, O.
Buffalo Forge Co., Buffalo, N. Y.
Campbell Heating Co., Des Moines, Ia.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Clarage Fan Co., Kalamazoo, Mich.
Dalzen Mfg. Co., St. Clair, Mich.
Drayer-Hanson, Inc., Los Angeles, Calif.
Johnson Co., S. T., Philadelphia, Pa.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kehm Corp., The, Chicago, Ill.
Kennard Corp., St. Louis, Mo.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Refrigeration Economics Co., Inc., Canton, O.
Reznor Mfg. Co., Mercer, Pa.
Somers, Inc., H. J., Detroit, Mich.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn.
United States Radiator Corp., Detroit, Mich.
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

UNITS, AIR CONDITIONING, YEAR AROUND, ROOM TYPE, FLOOR CABINET

Self contained blower, cooling and heating coil, filter, humidifier unit for connection to remote compressor or cold water supply, and steam or hot water supply

Acme Industries, Inc., Jackson, Mich.
Air & Refrigeration Corp., New York, N. Y.
American Coils Co., Newark, N. J.
American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Auburn Burner Co., Auburn, Ind.
Baker Refrigeration Corp., South Windham, Me.
Brown Products Co., Forest Hills, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Bush Mfg. Co., West Hartford, Conn.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Clarage Fan Co., Kalamazoo, Mich.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., St. Louis, Mo
Drayer-Hanson, Inc., Los Angeles, Calif.
Frigidaire Div., General Motors Corp., Dayton, O.
Gannon Co., Russell R., Cincinnati, O.
Hastings Air Conditioning Co., Hastings, Neb.
International Mfg. Co., Oklahoma City, Okla.
Jaden Mfg. Co., Hastings, Neb.
Johnson Co., S. T., Philadelphia, Pa.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kennard Corp., St. Louis, Mo.
Kramer Trenton Co., Trenton, N. J.
Marlo Coil Co., St. Louis, Mo.
McQuay, Inc., Minneapolis, Minn.
Nat Corp., Kansas City, Mo.
Niagara Blower Co., New York, N. Y.
Refrigeration Appliances, Inc., Chicago, Ill.
Refrigeration Economics Co., Inc., Canton, O
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y
Servel, Inc., Evansville, Ind.
Trane Co., The, La Crosse, Wis.
Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
United States Air Conditioning Corp., Minneapolis, Minn
Viking Mfg. Corp., Cleveland, O.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

UNITS, CONDENSATE DISPOSAL, FOR AIR CONDITIONING EQUIPMENT

Eastern Industries, Inc., New Haven, Conn.
Little Giant Vaporizer Co., Inc., Oklahoma City, Okla

UNITS, COOLING, WINDOW TYPE

Artkraft Mfg. Co., Lima, O.
Automatic Firing Corp., St. Louis, Mo.
Blissfield Mfg. Co., Blissfield, Mich.
Carrier Corp., Syracuse, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., Dayton, O.
Crowell & Dunn, Inc., New York, N. Y.
Deering Air Conditioning Co., Cincinnati, O. (for casement windows)
Fedders-Quigan Corp., Buffalo, N. Y.
Fresh'nd-Aire Company, Div. of Cory Corp., Chicago, Ill.
Frigidaire Div., General Motors Corp., Dayton, O.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Kelvinator Div., Nash-Kelvinator Corp., Detroit, Mich.
Lipman Refrigeration Div., Yates-American Machine Co., Beloit, Wis
Magic Chef, Inc., St. Louis, Mo.
Mitchell Mfg. Co., Chicago, Ill.
National Engineering & Mfg. Co., Kansas City, Mo.
National Gas Equipment Co., Inc., Terrell, Tex.
Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif
Philco Corp., Philadelphia, Pa.
Pleasantaire Corp., Washington, D. C.
Quiet-Heet Mfg. Corp., Newark, N. J.
Radio Corp. of America, RCA Victor Div., Camden, N. J.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y
Robbins & Myers, Inc., Fan Div., Memphis, Tenn.
Sterling Air Conditioning Corp., Washington, D. C.
Sutton Corp., O. A., The, Wichita, Kan.
United States Air Conditioning Corp., Minneapolis, Minn.
Viking Mfg. Corp., Cleveland, O.
Worthington Corp., Air Conditioning Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

UNITS, FUEL OIL, HEATING, PUMPING AND STRAINING

Ace Engineering Co., Chicago, Ill.
Byron Jackson Co., Los Angeles, Calif.
Condenser Service & Engineering Co., Inc., Hoboken, N. J
Davis Engineering Corp., Elizabeth, N. J.
Drying Systems, Inc., Chicago, Ill.
Duo-Therm Div., Motor Wheel Corp., Lansing, Mich.
Engineer Co., New York, N. Y.
Faber Engineer Co., Philadelphia, Pa.
Foster Pump Wks., Inc., Brooklyn, N. Y.
Graham Mfg. Co., Inc., New York, N. Y.
Hauck Mfg. Co., Brooklyn, N. Y.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Leahy Mfg. Co., Los Angeles, Calif.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Peabody Engineering Corp., New York, N. Y.
Petro, Cleveland, O.
Power Mfg. Co., Lansing, Mich.
Ray Oil Burner Co., San Francisco, Calif.
Staples & Pfeiffer, San Francisco, Calif.
Todd Shipyards Corp., Combustion Equipment Div., Elmhurst, L. I., N. Y.
Tuthill Pump Co., Chicago, Ill.
Wilson Engineering Corp., Chicago, Ill.

UNITS, STERILIZING, AIR

Air Purification Service, Inc., New York, N. Y.
Cooper Hewitt Electric Co., Hoboken, N. J.
Germatrol Corp., Pittsburgh, Pa.
Hanovia Chemical & Mfg. Co., Newark, N. J.

Health Trola Div., Excel Heating & Air Conditioning Co., Chicago, Ill.
Iron City Chemical Co., Valencia, Pa.
Lientz Co., B. P., Kansas City, Mo.
National Air Conditioning, Inc., Johnstown, Pa.
Nelson, Herman Products, American Air Filter Co., Inc., Louisville, Ky.
Pittsburgh Chemical Laboratories, Inc., Pittsburgh, Pa.

UNITS, WINDOW VENTILATOR AND FILTER

Airgard Mfg. Co., Chicago, Ill.
American Coolair Corp., Jacksonville, Fla.
Berns Mfg. Co., Chicago, Ill.
Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Goettl Bros. Metal Prod., Inc., Phoenix, Ariz.
Health Trola Div., Excel Heating & Air Conditioning Co., Chicago
Ilg Electric Ventilating Co., Chicago, Ill.
Kaiser Co., H. S., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Palmer Mfg. Corp., Phoenix, Ariz.
Reed Unit-Fans, Inc., New Orleans, La.
Reliable Metal Engineering Co., Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Somers Inc., H. J., Detroit, Mich.
Standard Electric Mfg. Co., West Berlin, N. J.
Utility Appliance Corp., Los Angeles, Calif.

UNIVERSAL JOINTS

See Joints, Universal, for Operating Valves

VACUUM CLEANERS FOR BOILERS

See Cleaners, Vacuum, for Boilers

VACUUM CLEANING SYSTEMS, FITTINGS FOR

See Fittings for Central Vacuum Cleaning Systems

VACUUM GAGES

See Gages, Indicating, Vacuum

VACUUM HEATING SYSTEMS

See Systems, Heating, Vacuum

VACUUM PUMPS

See Pumps, Vacuum

VACUUM RECORDERS

See Recorders, Pressure and Vacuum

VALVE OPERATORS

See Operators, Valve

VALVE RESEATERS

See Reseaters, Valve

VALVES, AIR OPERATING

American Moistening Co., Providence, R. I.
Atlas Valve Co., Newark, N. J.
Automatic Switch Co., Orange, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Barksdale Valves, Los Angeles, Calif.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Bellows Co., The, Akron, O.
Bristol Co., The, Waterbury, Conn.
Clark Controller Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
De Zurik Shower Co., Sartell, Minn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
Gotham Instrument Co., Div., American Machine & Metals, Inc., New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hills-McCanna Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hunt & Son, Inc., C. B., Salem, O.
Illinois Engineering Co., Chicago, Ill.
Keckley Co., O. Co., Chicago, Ill.
Keller Tool Co., Grand Haven, Mich.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Hamilton, O.
Ledeen Mfg. Co., Los Angeles, Calif.
Leslie Co., Lyndhurst, N. J.
McAlear Mfg. Co., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Norwalk Valve Co., South Norwalk, Conn.
Paul Valve Corp., New York, N. Y.
Powell Co., Wm., The, Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
Schade Valve Mfg. Co., Philadelphia, Pa.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Trerice Co., H. O., Detroit, Mich.
Wilson Engineering Corp., Chicago, Ill.

VALVES, ANGLE

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Car & Foundry Co., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Bordo Co., Inc., L. J., Glenside, Pa. (Plug)
Carpenter Mfg. Corp., The, Cleveland, O.
Central Brass Mfg. Co., Cleveland, O.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
De Zurik Shower Co., Sartell, Minn.
Duriron Co., The, Dayton, O. (acid resisting)
Edward Valves, Inc., East Chicago, Ind.
Fairbanks Co., The, New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
General Ceramics & Steatite Corp., Keasbey, N. J.
Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hammond Brass Works, Hammond, Ind.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Henry Valve Co., Melrose Park, Ill.
Hills-McCanna Co., Chicago, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
Jarecki Valve Div. of H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard Rubber)
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
McAlear Mfg. Co., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Shank Co., Cyrus, Chicago, Ill.
Stockham Valves & Fittings, Birmingham, Ala.
Strahman Valves, Inc., New York, N. Y.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, BALANCING, FOR FORCED HOT WATER HEATING SYSTEMS

Detroit Controls Corp., The, Detroit, Mich.
Farris Engineering Corp., Palisades Park, N. J.
G & H Mfg. Co., Philadelphia, Pa.
General Heaters & Regulators Co., Chicago, Ill.
Hammond Brass Works, Hammond, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.

Homestead Valve Mfg. Co., Coraopolis, Pa.
Illinois Engineering Co., Chicago, Ill.
J O Mfg. Co., South Gate, Calif.
Maid-O'-Mist, Inc., Chicago, Ill.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Ohio Brass Co., Mansfield, O.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.

VALVES, BAR STOCK

Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Conoflow Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Grove Regulator Co., Oakland, Calif.
Guardian Products Corp., Michigan City, Ind.
Hammel-Dahl Co., Providence, R. I.
Kerotest Mfg. Co., Pittsburgh, Pa.
Paul Valve Corp., New York, N. Y.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., The, Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa
Shank Co., Cyrus, Chicago, Ill.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Walworth Co., New York, N. Y.
Weatherhead Co., The, Cleveland, O.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, BLOW-OFF

Barrett Machine Co., Pittsburgh, Pa.
Bordo Co., Inc., L. J., Glenside, Pa.
Carpenter Mfg. Corp., The, Cleveland, O.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Crane Co., Chicago, Ill.
Edward Valves, Inc., East Chicago, Ind.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., The, New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kaye & MacDonald, Inc., West Orange, N. J.
Keckley Co., O. C., Chicago, Ill.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Madden Corp., The, Chicago, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
McDonnell & Miller, Inc., Chicago, Ill.
Norgren Co., C. A., Englewood, Colo.
Ohio Injector Co., Wadsworth, O.
Paul Valve Corp., New York, N. Y.
Powell Co., Wm., The, Cincinnati, O.
Schade Valve Mfg. Co., Philadelphia, Pa.
Strong, Carlisle & Hammond Co., Cleveland, O.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O
Wilson Engineering Corp., Chicago, Ill.
Yarnall-Waring Co., Philadelphia, Pa.

VALVES, BOILER, NON-RETURN

Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Golden Anderson Valve Specialty Co., Pittsburgh, Pa.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.

VALVES, BUTTERFLY

Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Conoflow Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fisher Governor Co., Marshalltown, Ia.
Fischer & Porter Co., Hatboro, Pa.
General Ceramics & Steatite Corp., Keasbey, N. J.
General Controls Co., Glendale, Calif.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Homestead Valve Mfg. Co., Coraopolis, Pa.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
North American Mfg. Co., Cleveland, O.
Norwalk Valve Co., South Norwalk, Conn.
Powell Co., Wm., The, Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Tri-Clover Machine Co., Kenosha, Wis.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, CHECK

Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Car & Foundry Co., New York, N. Y.
American Hard Rubber Co., New York, N. Y. (Rubber lined)
Aminco Refrigeration Products Co., Detroit, Mich.
Amp Corp., St. Louis, Mo.
Barrett, Haentjens & Co., Hazelton, Pa.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cla-Val Co., Alhambra, Calif.
Cochrane Corp., Philadelphia, Pa.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Fairbanks Co., The, New York, N. Y.
Foster Engineering Co., Union, N. J.
Frick Co., Waynesboro, Pa.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Ceramics & Steatite Corp., Keasbey, N. J. (chemical stoneware & porcelain)
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hammond Brass Works, Hammond, Ind.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Henry Valve Co., Melrose Park, Ill.
Hersey Mfg. Co., South Boston, Mass.
Imperial Brass Mfg. Co., Chicago, Ill.
Jacuzzi Bros., Inc., Richmond, Calif.
James-Pond-Clark, Pasadena, Calif.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mansfield & Green, Cleveland, O.
McRae Valve Co., Los Angeles, Calif.
Milwaukee Valve Co., Milwaukee, Wis.
Morse-Smith-Morse Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Norgren Co., C. A., Englewood, Colo.
Northern Indiana Brass Co., Elkhart, Ind.
Norwalk Valve Co., South Norwalk, Conn.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Pokorney Mfg. Co., Chicago, Ill.
Powell Co., Wm., The, Cincinnati, O.
Preferred Utilities Mfg. Corp., New York, N. Y.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass. (Bleeder type)
Saran Lined Pipe Co., Ferndale, Mich. (Saran Lined)
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Shank Co., Cyrus, Chicago, Ill.
Smolensky Valve Co., Inc., Bedford, O.
Stockham Valves & Fittings, Birmingham, Ala.
Stokes Molded Products, Inc., Trenton, N. J. (Hard rubber)
Strong, Carlisle & Hammond Co., Cleveland, O.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
White Flomatic Corp., Hoosick Falls, N. Y.
Whittaker Co., Wm. R., Los Angeles, Calif.
Williams Gauge Co., The, Pittsburgh, Pa. (Noiseless)
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, COMPRESSOR

Baker Refrigeration Corp., South Windham, Me.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Detroit Stamping Co., Detroit, Mich.
Durabla Mfg. Co., New York, N. Y.
Electric Sprayit Co., The, Sheboygan, Wis.

Frick Co., Waynesboro, Pa.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
OPW Corp., Cincinnati, O.
Ohio Injector Co., Wadsworth, O.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Vilter Mfg. Co., The, Milwaukee, Wis.
Voss Co., J. H. H., Inc., New York, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, DIAPHRAGM

American Hard Rubber Co., New York, N. Y. (Rubber lined)
Atlas Valve Co., Newark, N. J.
Automatic Switch Co., Orange, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Black Sivalls & Bryson, Inc., Kansas City, Mo.
Bristol Co., The, Waterbury, Conn.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Cla-Val Co., Alhambra, Calif.
Conoflow Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Fischer & Porter Co., Hatboro, Pa.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Foxboro Co., Foxboro, Mass.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware & porcelain)
General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grinnell Co., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Hills-McCanna Co., Chicago, Ill.
Hubbell Corp., Mundelein, Ill.
Hunt & Son, Inc., C. B., Salem, O.
Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Hamilton, O.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
Leslie Co., Lyndhurst, N. J.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
McRae Valve Co., Los Angeles, Calif.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia.
Mueller Brass Co., Port Huron, Mich.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Radiator Co., The, Johnstown, Pa.
Norgren Co., C. A., Englewood, Colo.
North American Mfg. Co., Cleveland, O.
Norwalk Valve Co., South Norwalk, Conn.
Parks-Cramer Co., Fitchburg, Mass.
Paul Valve Corp., New York, N. Y.
Penn Industrial Equipment Corp., Philadelphia, Pa.
Perfex Corp., Milwaukee, Wis.
Powers Regulator Co., Skokie, Ill.
R-S Products Corp., Philadelphia, Pa.
Ross Valve Mfg. Co., Inc., Troy, N. J.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Saran Lined Pipe Co., Ferndale, Mich. (Saran lined)
Schade Valve Mfg. Co., Philadelphia, Pa.
Spence Engineering Co., Inc., Walden, N. Y.
Staples & Pfeiffer, San Francisco, Calif.
Swartwout Co., The, Cleveland, O.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Trane Co., The, La Crosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
United States Rubber Co., New York, N. Y.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.
White-Rodgers Electric Co., St. Louis, Mo.

VALVES, DIAPHRAGM, PACKLESS

Automatic Switch Co., Orange, N. J.
Cla-Val Co., Alhambra, Calif.
Foxboro Co., Foxboro, Ill.
Henry Valve Co., Melrose Park, Ill.
Hills-McCanna Co., Chicago, Ill.
Kerotest Mfg. Co., Pittsburgh, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Superior Valve and Fittings Co., Pittsburgh, Pa.

VALVES, FIRE PROTECTION, SPRINKLER SYSTEM CONTROL

Allen Mfg. Co., W. D., Chicago, Ill.
Barber-Colman Co., Rockford, Ill.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., The, New York, N. Y.
Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hersey Mfg. Co., South Boston, Mass.
Hodgman Mfg. Co., Taunton, Mass.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
McRae Valve Co., Los Angeles, Calif.
Ohio Injector Co., Wadsworth, O.
Raisler Corp., Grimes Sprinkler Div., New York, N. Y.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwood Sprinkler Co., Worcester, Mass.
Stockham Valves & Fittings, Birmingham, Ala.
Walworth Co., New York, N. Y.

VALVES, FLOAT

A-P Controls Corp., Milwaukee, Wis. (Oil)
Aerotec Corp., The, Greenwich, Conn.
Alco Valve Co., St. Louis, Mo.
American Hard Rubber Co., New York, N. Y. (Hard rubber)
American Moistening Co., Providence, R. I.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Beckett & Co., Inc., Thomas, Dallas, Tex.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Caldwell Co., W. E., Louisville, Ky.
Cash Co., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Cla-Val Co., Alhambra, Calif.
Cleveland Humidifier Co., Cleveland, O.
Cochrane Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Detroit Controls Corp., The, Detroit, Mich.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Frick Co., Waynesboro, Pa.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hubbell Corp., Mundelein, Ill.
Illinois Engineering Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Hamilton, O.
Locke Regulator Co., Salem, Mass.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Maid-O'-Mist, Inc., Chicago, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Industrial Div., Phialdelphia, Pa.
Monash-Younker Co., Chicago, Ill.
Morey, Dan, Los Angeles, Calif.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Perfex Corp., Milwaukee, Wis.
Phillips & Co., H. A., Chicago, Ill.
R-S Products Corp., Philadelphia, Pa.
Robert Mfg. Co., Los Angeles, Calif.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Shade Valve Mfg. Co., Philadelphia, Pa.
Schaub Engineering Co., Fred H., Chicago, Ill.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Scoville Mfg. Co., Waterville Div., Waterville, Conn.
Spence Engineering Co., Inc., Walden, N. Y.
Stickle Steam Specialties Co., Indianapolis, Ind.
Watts Regulator Co., Lawrence, Mass.
Whittington Pump & Engineering Corp., Indianapolis, Ind.

VALVES, FLOW CONTROL, FOR HOT WATER HEATING SYSTEMS

Barber-Colman Co., Rockford, Ill.
Bell & Gossett Co., Morton Grove, Ill.
General Controls Co., Glendale, Calif.
General Heaters & Regulators Co., Chicago, Ill.
Hammel-Dahl Co., Providence, R. I.
Illinois Engineering Co., Chicago, Ill.
Kainer & Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Quality Specialty Co., Inc., Philadelphia, Pa.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Webster & Co., Warren, Camden, N. J.
White Flomatic Corp., Hoosick Falls, N. Y.

VALVES, FORGED STEEL

American Meter Co., Inc., New York, N. Y.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Conoflow Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Grove Regulator Co., Oakland, Calif.
Henry Valve Co., Melrose Park, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
Ohio Injector Co., Wadsworth, O.
Paul Valve Corp., New York, N. Y.
Penberthy Injector Co., Detroit, Mich.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
R-S Products Corp., Philadelphia, Pa.
Schutte & Koerting Co., Philadelphia, Pa.
Vogt Machine Co., Henry, Louisville, Ky.

VALVES, GATE, ALLOY

Alloy Steel Products Co., Linden, N. J.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Edward Valves, Inc., East Chicago, Ind.
Electric Steel Foundry Co., Portland, Ore.
Hasco Valve & Machine Co., Milwaukee, Wis.
Jenkins Bros., New York, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, GATE, BRASS AND BRONZE

Belknap Mfg. Co., Bridgeport, Conn.
Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Darling Valve Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Detroit Controls Corp., The, Detroit, Mich.
Eddy Valve Co., Waterford, N. Y.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., The, New York, N. Y.
Hammond Brass Wks., Hammond, Ind.
Jarecki Valve Div., H. K. Porter & Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Tin lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Valves & Fittings, Birmingham, Ala.
Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, GATE, IRON BODY

Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
De Zurik Shower Co., Sartell, Minn.
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Everlasting Valve Co., Jersey City, N. J.
Fairbanks Co., The, New York, N. Y.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead and tin lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Mueller Co., Decatur, Ill.
Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Scott Valve Mfg. Co., Detroit, Mich.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., New York, N. Y.
Stockham Valves & Fittings, Birmingham, Ala.
Walworth Co., New York, N. Y.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, GATE, MALLEABLE IRON

Bordo Co., Inc., L. J., Glenside, Pa
Crane Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.

VALVES, GATE, STEEL

Bordo Co., Inc., L. J., Glenside, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
De Zurik Shower Co., Sartell, Minn.
Edward Valves, East Chicago, Ind.
Everlasting Valve Co., Jersey City, N. J.
Hamer Oil Tool Co., Long Beach, Calif.
Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lead Lined Iron Pipe Co., Wakefield, Mass. (lead lined)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, GLOBE, ALLOY

Alloy Steel Products Co., Linden, N. J.
Carpenter Mfg. Corp., The, Cleveland, O.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Crane Co., Chicago, Ill.
Edward Valves, Inc., East Chicago, Ind.
Electric Steel Foundry Co., Portland, Ore.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hasco Valve & Machine Co., Milwaukee, Wis.
Jenkins Bros., New York, N. Y.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Milwaukee Valve Co., Milwaukee, Wis.
Ohio Injector Co., Wadsworth, O.
Powell Co., Wm., Cincinnati, O.
Strahman Valves, Inc., New York, N. Y.
Walworth Co., New York, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, GLOBE, BRASS AND BRONZE

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belknap Mfg. Co., Bridgeport, Conn.
Bowser, Inc., Fort Wayne, Ind.
California Brass Mfg. Co., Los Angeles, Calif.
Carpenter Mfg. Corp., The, Cleveland, O.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Chase Brass & Copper Co., Waterbury, Conn.

Cleveland Brass Mfg. Co., The, Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Detroit Brass & Malleable Wks., Detroit, Mich.
Detroit Controls Corp., The, Detroit, Mich.
Fairbanks Co., The, New York, N. Y.
Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hammond Brass Wks., Hammond, Ind.
Henry Valve Co., Melrose Park, Ill.
Jarecki Valve Div. of H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Morse-Smith-Morse, Inc., Watertown, Mass.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
OPW Corp., Cincinnati, O.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwood Sprinkler Co., Worcester, Mass.
Scott Valve Mfg. Co., Detroit, Mich.
Stockham Valves & Fittings, Birmingham, Ala.
Strahman Valves, Inc., New York, N. Y.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Walworth Co., New York, N. Y.
White Flomatic Corp., Hoosick Falls, N. Y.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, GLOBE, IRON BODY

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadephia, Pa.
Crane Co., Chicago, Ill.
Fairbanks Co., The, New York, N. Y.
Frick Co., Waynesboro, Pa.
Grinnell Co., Inc., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Lunkenheimer Co., Cincinnati, O.
Ohio Injector Co., Wadsworth, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Shank Co., Cyrus, Chicago, Ill.
Stockham Valves & Fittings, Birmingham, Ala.
Strahman Valves, Inc., New York, N. Y.
Walworth Co., New York, N. Y.

VALVES, GLOBE, MALLEABLE IRON

Crane Co., Chicago, Ill.
Powell Co., Wm., Cincinnati, O.
Walworth Co., New York, N. Y.

VALVES, GLOBE, STEEL

Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Crane Co., Chicago, Ill.
De Zurik Shower Co., Sartell, Minn.
Edward Valves, Inc., East Chicago, Ind.
Grove Regulator Co., Oakland, Calif.
Henry Valve Co., Melrose Park, Ill.
Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Co., Industrial Div., Philadelphia, Pa.
Ohio Injector Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwood Sprinkler Co., Worcester, Mass.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Shank Co., Cyrus, Chicago, Ill.
Strahman Valves, Inc., New York, N. Y.

Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.

VALVES, INSTRUMENT

Bristol Co., The, Waterbury, Conn.
Edward Valves, Inc., East Chicago, Ind.
Foxboro Co., Foxboro, Mass.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hills-McCanna Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Ohio Injector Co., Wadsworth, O.
Penberthy Injector Co., Detroit, Mich.
Trerice Co., H. O., Detroit, Mich.
Warren Engineering Co., Broadway, N. J.
Watts Regulator Co., Lawrence, Mass.
Weston Electrical Instrument Corp., Newark, N. J.

VALVES, LINED

American Hard Rubber Co., New York, N. Y. (Rubber lined)
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cla-Val Co., Alhambra, Calif.
Conoflow Corp., Philadelphia, Pa.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
De Zurik Shower Co., Sartell, Minn.
Division Lead Co., Chicago, Ill.
General Controls Co., Glendale, Calif.
Goodrich Co., B. F., Akron, O. (Rubber lined)
Grinnell Co., Inc., Providence, R. I.
Grove Regulator Co., Oakland, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis. (Rubber)
Hills-McCanna Co., Chicago, Ill.
Lead Lined Iron Pipe Co., Wakefield, Mass. (Lead lined)
National Lead Co., New York, N. Y. (Lead)
Paul Valve Corp., New York, N. Y.
R-S Products Corp., Philadelphia, Pa.
Raybestos-Manhattan, Inc., Passaic, N. J. (Rubber)
Resisto Pipe & Valve Co., East Cambridge, Mass. (Lead)
Rockwell Co., W. S., Fairfield, Conn.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Saran Lined Pipe Co., Ferndale, Mich. (Saran lined)
United States Rubber Co., New York, N. Y.
United States Stoneware Co., New York, N. Y.

VALVES, MIXING, HOT AND COLD WATER

Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Bell & Gossett Co., Morton Grove, Ill.
Crane Co., Chicago, Ill.
Dole Valve Co., The, Chicago, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Fittings Co., Providence, R. I.
Holby Valve Co., New York, N. Y.
Jordan Regulator Corp., Lebanon, O.
Lawler Automatic Controls, Inc., Mount Vernon, N. Y.
Leonard Valve Co., Cranston, R. I.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Taco Heaters, Inc., Providence, R. I.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Watts Regulator Co., Lawrenceville, Mass.
Webster & Co., Warren, Camden, N. J.
Yula Water Heaters Inc., New York, N. Y.

VALVES, MIXING, STEAM AND WATER

Central Brass Mfg. Co., Cleveland, O.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Hammel-Dahl Co., Providence, R. I.
Johnson Service Co., Milwaukee, Wis.
Leonard Valve Co., Cranston, R. I.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia, Pa.
Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls Inc., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.

VALVES, MOTOR OPERATED

Autempco Corp., New York, N. Y.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.

Bailey Co., Chas. M., San Francisco, Calif.
Barber-Colman Co., Rockford, Ill.
Barksdale Valves, Los Angeles, Calif.
Belco Industrial Equipment Div., Inc., Paterson, N. J.
Bell & Gossett Co., Morton Grove, Ill.
Bristol Co., The, Waterbury, Conn.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass
Cochrane Corp., Philadelphia, Pa.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Cutler-Hammer, Inc., Milwaukee, Wis.
Darling Valve & Mfg. Co., Williamsport, Pa.
Davis Regulator Co., Chicago, Ill.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Eclipse Fuel Engineering Co., Rockford, Ill.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Fischer & Porter Co., Hatboro, Pa.
Foxboro Co., Foxboro, Mass.
General Controls Co., Glendale, Calif.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hills-McCanna Co., Chicago, Ill.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Illinois Engineering Co., Chicago, Ill.
J O Mfg. Co., South Gate, Calif.
Jenkins Bros., New York, N. Y.
Keckley Co., O. C., Chicago, Ill.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Kieley & Mueller, Inc., North Bergen, N. J.
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Mason-Neilan Regulator Co., Boston, Mass.
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa.
North American Mfg. Co., Cleveland, O.
Ohio Injector Co., Wadsworth, O.
Paul Valve Corp., New York, N. Y.
Penn Controls, Inc., Goshen, Ind.
Philadelphia Gear Works, Inc., Philadelphia, Pa.
Porter Co., Inc., H. K., Tulsa, Okla.
Powell Co., Wm., Cincinnati, O.
R-S Products Corp., Philadelphia, Pa.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading Pa.
Rensselaer Valve Co., Cohoes, N. Y.
Rockwell Co., W. S., Fairfield, Conn.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Stockham Valves & Fittings, Birmingham, Ala.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vogt Machine Co., Henry, Louisville, Ky.
Walworth Co., New York, N. Y.
Webster & Co., Warren, Camden, N. J.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, NEEDLE

A-P Controls Corp., Milwaukee, Wis. (Oil)
Alloy Steel Products Co., Linden, N. J. (Stainless steel)
American Meter Co., Inc., New York, N. Y.
Carpenter Mfg. Corp., The, Cleveland, O. (Stainless steel stem, brass bar stock body)
Central Brass Mfg. Co., Cleveland, O.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Cooper Co., Clark, Palmyra, N. J.
Couplings Co., Chicago, Ill.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Detroit Brass & Malleable Wks., Detroit, Mich.
Detroit Controls Corp., The, Detroit, Mich.
Edward Valves, Inc., East Chicago, Ind.
Fairbanks Co., The, New York, N. Y.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Lunkenheimer Co., Cincinnati, O.
Maid-O'-Mist, Inc., Chicago, Ill.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marsh Heating Equipment Co., Skokie, Ill.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Morrison Brothers Co., Dubuque, Ia.
Norgren Co., C. A., Englewood, Colo.
Ohio Brass Co., Mansfield, O.
Ohio Injector Co., Wadsworth, O.
Patrol Valve Co., The, Cleveland, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Shank Co., Cyrus, Chicago, Ill.
Stockham Valves & Fittings, Birmingham, Ala.
Superior Controls Co., Inc., Los Angeles, Calif.
Swift Lubricator Co., Elmira, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Vacuum-Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Walworth Co., New York, N. Y.
Weatherhead Co., The, Cleveland, O.
Webster Electric Co., Racine, Wis. (Pressure regulating valve for oil burners)
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, OXYGEN

Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Ohio Injector Co., Wadsworth, O.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Walworth Co., New York, N. Y.

VALVES, PLASTIC

American Agile Corp., Cleveland, O.
General Ceramics & Steatite Corp., Keasbey, N. J.
Haveg Corp., Newark, Del.
Hills-McCanna Co., Chicago, Ill.
Saran Lined Pipe Co., Ferndale, Mich.

VALVES, PLUG

Altens Foundry & Machine Works, Inc., Lancaster, O.
American Car & Foundry Co., New York, N. Y.
Andale Co., Philadelphia, Pa.
Ardee Mfg. Co., Inc., Los Angeles, Calif.
Barrett, Haentjens & Co., Hazleton, Pa.
Barrett Machine Co., Pittsburgh, Pa.
Belfield Valve, Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Bordo Co., Inc., L. J., Glenside, Pa.
Carpenter Mfg. Corp., The, Cleveland, O.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Cooper Alloy Foundry Co., The, Hillside, N. J.
Couplings Co., Chicago, Ill.
Crane Co., Chicago, Ill.
De Zurik Shower Co., Sartell, Minn. (rubber faced)
Duriron Co., Inc., Dayton, O. (Acid resisting)
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Faber Engineering Co., Inc., Philadelphia, Pa.
Fairbanks Co., The, New York, N. Y.
General Ceramics & Steatite Corp., Keasbey, N. J. (Chemical stoneware & porcelain)
Gilbert Brass Foundry Co., St. Louis, Mo.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Hamer Oil Tool Co., Long Beach, Calif.
Hasco Valve & Machine Co., Milwaukee, Wis.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Imperial Brass Mfg. Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Knight, Maurice A., Akron, O. (Stoneware)
Ludlow Valve Mfg. Co., Inc., Troy, N. Y.
Lunkenheimer Co., Cincinnati, O.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Mueller Co., Decatur, Ill.
National Airoil Burner Co., Inc., Philadelphia, Pa.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa. (Lubricated)
Ohio Injector Co., Wadsworth, O.
Ostlind Valve, Inc., Portland, Ore.
Parks-Cramer Co., Fitchburg, Mass. (jacketed)
Pittsburgh Brass Mfg. Co., Pittsburgh, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Porter Co., Inc., H. K., Tulsa, Okla.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa
R-S Products Corp., Philadelphia, Pa.
Reynolds Shaffer Co., Detroit, Mich.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Saran Lined Pipe Co., Ferndale, Mich. (Saran lined)
Stockham Valves & Fittings, Birmingham, Ala.
Strahman Valves, Inc., New York, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Tri-Clover Machine Co., Kenosha, Wis.
Walworth Co., New York, N. Y.
Weatherhead Co., The, Cleveland, O.
Wedgeplug Valve Co., Inc., New Orleans, La.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.

Whittaker Co., Wm. R., Los Angeles, Calif.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.

VALVES, PRESSURE REDUCING AND REGULATING, AIR AND GAS

American Car & Foundry Co., New York, N. Y.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Bellows Co., The, Akron, O.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Boylston Steam Specialty Co., Chicago, Ill.
CCA Products, Inc., Glendale, Calif.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument & Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
DeVilbiss Co., The, Toledo, O.
Dockson Corp., Detroit, Mich.
Eclipse Fuel Engineering Co., Rockford, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Harris Calorific Co., The, Cleveland, O.
Hasco Valve & Machine Co., Milwaukee, Wis.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Hubbell Corp., Mundelein, Ill.
Illinois Engineering Co., Chicago, Ill.
Jordan Regulator Corp., Lebanon, O.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Leslie Co., Lyndhurst, N. J.
Liquid Carbonic Corp., The, Chicago, Ill.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Modern Engineering Co., St. Louis, Mo.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
National Cylinder Gas Co., Chicago, Ill.
Norgren Co., C. A., Englewood, Colo.
Norwalk Valve Co., South Norwalk, Conn.
Penn Controls, Inc., Goshen, Ind.
Powers Regulator Co., Skokie, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Strong, Carlisle & Hammond Co., Cleveland, O.
Sullivan Valve & Engineering Co., Butte, Mont.
Swartwout Co., The, Cleveland, O.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Thrush & Co., H. A., Peru, Ind.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.

VALVES, PRESSURE REDUCING AND REGULATING, HOT WATER

Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Boylston Steam Specialty Co., Chicago, Ill.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Cla-Val Co., Alhambra, Calif.
Conoflow Corp., Philadelphia, Pa.
Cooper Co., Clark, Palmyra, N. J.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Chicago, Ill.
Jordan Regulator Corp., Lebanon, O.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Mason-Neilan Regulator Co., Boston, Mass.
McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Powers Regulator Co., Skokie, Ill.
Republic Flow Meters Co., Chicago, Ill.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schaible Co., The, Cincinnati, O.
Spence Engineering Co., Inc., Walden, N. Y.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., The, Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Tagliabue Instruments Div. Weston Electrical Instrument Corp., Newark, N. J.
Taylor Instrument Companies, Rochester, N. Y.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, LaCrosse, Wis.
Trerice Co., H. O., Detroit, Mich.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
White Flomatic Corp., Hoosick Falls, N. Y.

VALVES, PRESSURE REDUCING AND REGULATING, STEAM

American District Steam Co., Inc., North Tonawanda, N. Y.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Bailey Meter Co., Cleveland, O.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Boylston Steam Specialty Co., Chicago, Ill.
Brooke Engineering Co., Inc., Philadelphia, Pa.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Chaplin-Fulton Mfg. Co., Pittsburgh, Pa.
Clark Mfg. Co., Cleveland, O.
Conoflow Corp., Philadelphia, Pa.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
Defender Instrument and Regulator Co., St. Louis, Mo.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Dunham Co., C. A., Chicago, Ill.
Eclipse Fuel Engineering Co., Rockford, Ill.
Fischer Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hagan Corp., Pittsburgh, Pa.
Hammel-Dahl Co., Providence, R. I.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Chicago, Ill.
Jordan Regulator Corp., Lebanon, O.
Keckley Co., O. C., Chicago, Ill.
Kieley & Mueller, Inc., North Bergen, N. J.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Leslie Co., Lyndhurst, N. J.
Locke Regulator Co., Salem, Mass.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Mason-Neilan Regulator Co., Boston, Mass.

McAlear Mfg. Co., Chicago, Ill.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Powers Regulator Co., Skokie, Ill.
Republic Flow Meters Co., Chicago, Ill.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schutte and Koerting Co., Cornwells Heights, Buck County, Pa.
Shallcross Controls, Inc., Milwaukee, Wis.
Spence Engineering Co., Inc., Walden, N. Y.
Squires Co., C. E., Cleveland, O.
Staples & Pfeiffer, San Francisco, Calif.
Stickle Steam Specialties Co., Indianapolis, Ind.
Strong, Carlisle & Hammond Co., Cleveland, O.
Swartwout Co., The, Cleveland, O.
Tagliabue Corp., C. J., Newark, N. J.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corps., Indianapolis, Ind.
Taylor Instrument Companies, Rochester, N. Y.
Trerice Co., H. O., Detroit, Mich.
Vapor Heating Corp., Chicago, Ill.
Warren Engineering Co., Broadway, N. J.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.

VALVES, PUMP

Anchor Packing Co., Philadelphia, Pa.
Burrows Mfg. Co., F. A., York, Pa.
Dick Co., Inc., R. & J., Passaic, N. J.
Durabla Mfg. Co., New York, N. Y.
Farris Engineering Corp., Palisades Park, N. J.
Garlock Packing Co, Palmyra, N. Y.
Goodrich Co., B. F., Akron, O.
Jacuzzi Bros., Inc., Richmond, Calif.
Madden Corp., The, Chicago, Ill.
Quaker Rubber Corp., Div. of H. K. Porter Co., Inc., Philadelphia, Pa
Red Jacket Mfg. Co., Davenport, Ia.
United States Rubber Company, New York, N. Y.
Williams Gauge Co., The, Pittsburgh, Pa.

VALVES, RADIATOR, AIR

Anderson Products, Inc., Cambridge, Mass.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Bridgeport Brass Co., Bridgeport, Conn.
Chicago Specialty Mfg. Co., Chicago, Ill.
Detroit Controls Corp., The, Detroit, Mich.
Dole Valve Co., The, Chicago, Ill.
G & H Mfg. Co., Philadelphia, Pa.
Gorton Heating Co., Cranford, N. J.
Heat Timer Corp., New York, N. Y.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Keeney Mfg. Co., Newington, Conn.
Little Mfg. Co., M. S., Hartford, Conn.
Maid-O'-Mist, Inc., Chicago, Ill.
Majot Automatic Machine Co., Inc., East Orange, N. J.
McAlear Mfg. Co., Chicago, Ill.
Moreheat Distribution, Inc., Cincinnati, O.
New York Air Valve Corp., Brooklyn, N. Y.
Positive Control Co., The, Cincinnati, O.
Radiator Valve Co. of America, Philadelphia, Pa.
Riggio Co., Frank D., Rutherford, N. J.
Schaible Co., The, Cincinnati, O.
Sullivan Valve & Engineering Co., Butte, Mont.
Taco Heaters, Inc., Providence, R. I.
Thrush & Co., H. A., Peru, Ind.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, ELECTRIC

Barber-Colman Co., Rockford, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif.
Jenkins Bros., New York, N. Y.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Sarcotherm Controls, Inc., New York, N. Y.
Vapor Heating Corp., Chicago, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, PNEUMATIC

Johnson Service Co., Milwaukee, Wis.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Powers Regulator Co., Skokie, Ill.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, SELF-CONTAINED

Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
General Controls Co., Glendale, Calif.
Majot Automatic Machine Co., Inc., East Orange, N. J.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Sarco Co., Inc., New York, N. Y.
Sterling, Inc., Milwaukee, Wis.
Trane Co., The, LaCrosse, Wis.

VALVES, RADIATOR, AUTOMATIC TEMPERATURE CONTROL, SELF-CONTAINED, PACKLESS

Powers Regulator Co., Skokie, Ill.
Sarco Co., Inc., New York, N. Y.

VALVES, RADIATOR, ORIFICE

American District Steam Co., Inc., North Tonawanda, N. Y.
Barnes & Jones, Inc., Boston, Mass.
Cashin Co., W. D., Boston, Mass.
Dunham Co., C. A., Chicago, Ill.
Grinnell Co., Inc., Providence, R. I.
Illinois Engineering Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Marsh Valve Co., Dunkirk, N. Y.
New York Air Valve Corp., Brooklyn, N. Y.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Simplex Heating Specialty Co., Inc., Lynchburg, Va.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Trane Co., The, LaCrosse, Wis.
Webster & Co., Warren, Camden, N. J.

VALVES, RADIATOR, STEAM AND HOT WATER, HAND

Barnes & Jones, Inc., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Cashin Co., W. D., Boston, Mass.
Chase Brass & Copper Co., Waterbury, Conn.
Crane Co., Chicago, Ill.
Detroit Controls Corp., The, Detroit, Mich.
Dunham Co., C. A., Chicago, Ill.
Fairbanks Co., The, New York, N. Y.
Haines & Co., Inc., William S., Div. Sellers Injector Corp., Philadelphia, Pa.
Hammond Brass Wks., Hammond, Ind.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., Elmira, N. Y.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Milwaukee Valve Co., Milwaukee, Wis.
Ohio Brass Co., Mansfield, O.
Powell Co., Wm., Cincinnati, O.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Sterling, Inc., Milwaukee, Wis.
Trane Co., The, La Crosse, Wis.
United States Radiator Corp., Detroit, Mich.
Webster & Co., Warren, Camden, N. J.

VALVES, RADIATOR, STEAM AND HOT WATER, MODULATING

American District Steam Co., Inc., North Tonawanda, N. Y.
Barnes & Jones, Inc., Boston, Mass.
Bishop & Babcock Mfg. Co., Cleveland, O.
Cashin Co., W. D., Boston, Mass.
Cryer Trap & Valve Co., Inc., New York, N. Y.
Dunham Co., C. A., Chicago, Ill.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
Haines & Co., Inc., William S., Div. Sellers Injector Corp., Philadelphia, Pa.
Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Illinois Engineering Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Johnson Service Co., Milwaukee, Wis.
Marsh Heating Equipment Co., Skokie, Ill.
Marsh Valve Co., Dunkirk, N. Y.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Ohio Brass Co., Mansfield, O.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Sterling, Inc., Milwaukee, Wis.
Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., Indianapolis, Ind.
Vapor Specialty Co., New York, N. Y.
Webster & Co., Warren, Camden, N. J.

VALVES, REFRIGERATION (ANGLE, CHECK, GATE, GLOBE, NEEDLE, RELIEF)

Baker Refrigeration Corp., South Windham, Me.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.

Central Brass Mfg. Co., Cleveland, O.
Crane Co., Chicago, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Frick Co., Waynesboro, Pa.
Hammel-Dahl Co., Providence, R. I.
Henry Valve Co., Melrose Park, Ill.
Hills-McCanna Co., Chicago, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Lunkenheimer Co., Cincinnati, O.
Mueller Brass Co., Port Huron, Mich.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Shank Co., Cyrus, Chicago, Ill.
Superior Valve and Fittings Co., Pittsburgh, Pa.
Techniflex Corp., Port Jervis, N. Y.
Vilter Mfg. Co., Milwaukee, Wis.
Vogt Machine Co., Henry, Louisville, Ky.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

VALVES, REFRIGERATION, BACK PRESSURE

A-P Controls Corp., Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products Co., Detroit, Mich.
Bailey Co., Chas. M., San Francisco, Calif.
Baker Refrigeration Corp., South Windham, Me.
Cash Co., A. W., Decatur, Ill.
Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., Skokie, Ill.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Frigidaire Div., General Motors Corp., Dayton, O
General Controls Co., Glendale, Calif.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Mundelein, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Mueller Brass Co., Port Huron, Mich.
Schnacke, Inc., Evansville, Ind.
Temprite Products Corp., Birmingham, Mich.
Vilter Mfg. Co., The, Milwaukee, Wis.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

VALVES, REFRIGERATION, EXPANSION, CONSTANT PRESSURE

A-P Controls Corp., Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products Co., Detroit, Mich.
Baker Refrigeration Corp., South Windham, Me.
Cash Co., A. W., Decatur, Ill.
Crane Co., Chicago, Ill.
Detroit Controls Corp., The, Detroit, Mich.
Foster Engineering Co., Union, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
General Controls Co., Glendale, Calif.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Mundelein, Ill.
Lonergan Co., J. E., Philadelphia, Pa.
Mayson Mfg. Co., Detroit, Mich.
Tenney Engineering, Inc., Newark, N. J.
Vilter Mfg. Co., The, Milwaukee, Wis.
X L Refrigerating Co., Chicago, Ill.
York Corp., York, Pa.

VALVES, REFRIGERATION, EXPANSION, THERMOSTATIC

A-P Controls Corp., Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Cutler-Hammer Inc., Milwaukee, Wis.
Detroit Controls Corp., The, Detroit, Mich.
Frigidaire Div., General Motors Corp., Dayton, O.
General Controls Co., Glendale, Calif.
Mayson Mfg. Co., Detroit, Mich.
Peerless of America, Inc., Chicago, Ill.
Sporlan Valve Co., St. Louis, Mo.
Tenney Engineering, Inc., Newark, N. J.
Vilter Mfg. Co., The, Milwaukee, Wis.
X L Refrigerating Co., Chicago, Ill.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE

Alco Valve Co., St. Louis, Mo.
Aminco Refrigeration Products Co., Detroit, Mich.
Armstrong Machine Works, Three Rivers, Mich.
Foster Engineering Co., Union, N. J.
Frick Co., Waynesboro, Pa.
Hubbell Corp., Mundelein, Ill.
Mercoid Corp., Chicago, Ill.
Phillips & Co., H. A., Chicago, Ill.
Temprite Products Corp., Birmingham, Mich.
Vilter Mfg. Co, Milwaukee, Wis.
Wabash Mfg. Co., Chicago, Ill.
Worthington Corp., Air Conditioning and Refrigeration Div., Harrison, N. J.
York Corp., York, Pa.

VALVES, REFRIGERATION, FLOAT, HIGH PRESSURE AND LOW PRESSURE

Aminco Refrigeration Products Co., Detroit, Mich.
Mayson Mfg. Co., Detroit, Mich.
Temprite Products Corp., Birmingham, Mich.
Vilter Mfg. Co., Milwaukee, Wis.
Voss Co., J. H. H., Inc., New York, N. Y.
York Corp., York, Pa.

VALVES, REFRIGERATION, LIQUID CONTROL, FLOAT PILOTED

Alco Valve Co., St. Louis, Mo.
Cooper Co., Clark, Palmyra, N. J.
Frick Co., Waynesboro, Pa.
Magnetro, Inc., Chicago, Ill.
Phillips & Co., H. A., Chicago, Ill.
York Corp., York, Pa.

VALVES, REFRIGERATION, MAGNETIC STOP

A-P Controls Corp., Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Automatic Switch Co., Orange, N. J.
Detroit Controls Corp., The, Detroit, Mich.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., Skokie, Ill.
Frick Co., Waynesboro, Pa.
General Controls Co., Glendale, Calif.
Hubbell Corp., Mundelein, Ill.
Mercoid Corp., Chicago, Ill.
Penn Controls, Inc., Goshen, Ind.
Skinner Electric Valve Div., Norwalk, Conn.
Sporlan Valve Co., St. Louis, Mo.

VALVES, REFRIGERATION, TEMPERATURE REGULATING OR SNAP ACTION SUCTION

Alco Valve Co., St. Louis, Mo.
Frigidaire Div., General Motors Corp., Dayton, O.
Temprite Products Corp., Birmingham, Mich.

VALVES, REFRIGERATION, WATER REGULATING, PRESSURE OR TEMPERATURE ACTUATED

A-P Controls Corp., Milwaukee, Wis.
Aminco Refrigeration Products Co., Detroit, Mich.
Art Valve Co., Chicago, Ill.
Bailey Co., Chas. M., San Francisco, Calif.
Cash Co., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., Skokie, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Fisher Governor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Frigidaire Div., General Motors Corp., Dayton, O.
Jordan Regulator Corp., Lebanon, O.
Klipfel Mfg. Co., Hamilton, O.
Madden Brass Products Co., Chicago, Ill.
Mayson Mfg. Co., Detroit, Mich.
Mercoid Corp., Chicago, Ill.
Penn Controls, Inc., Goshen, Ind.
Perfection Refrigeration Parts Co., Harvey, Ill.
Sarco Co., Inc., New York, N. Y.
Shank Co., Cyrus, Chicago, Ill.
Spence Engineering Co., Inc., Walden, N. Y.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
York Corp., York, Pa.

VALVES, RELIEF, HOT WATER, COMBINED PRESSURE AND TEMPERATURE OPERATED

Atlas Valve Co., Newark, N. J.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Fisher Govenor Co., Marshalltown, Ia.
Foster Engineering Co., Union, N. J.
Kamer & Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Mueller Co., Decatur, Ill.
Patrol Valve Co., The, Cleveland, O.
Sall Bros. Co., Rockford, Ill.
Schaible Co., The, Cincinnati, O.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Thrush & Co., H. A. Peru, Ind.
Trane Co., The, La Crosse, Wis.

Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED

Ashton Valve Co., Wrentham, Mass.
Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Central Brass Mfg. Co., Cleveland, O.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Davis Regulator Co., Chicago, Ill.
d'Este Div., Kaye & MacDonald, Inc., West Orange, N. J.
Durabla Mfg. Co., New York, N. Y.
Eddy Valve Co., Waterford, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Fisher Governor Co., Marshalltown, Ia.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Kainer & Co., Chicago, Ill.
Keckley Co., O. C., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
McAlear Mfg. Co., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Milwaukee Valve Co., Milwaukee, Wis.
Mueller Co., Decatur, Ill.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Patrol Valve Co., The, Cleveland, O.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Schaible Co., The, Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Staples & Pfeiffer, San Francisco, Calif.
Swartwout Co., The, Cleveland, O.
Taco Heaters, Inc., Providence, R. I.
Tagliabue Instruments Div., Weston Electrical Instrument Corp., Newark, N. J.
Texsteam Corp., Houston, Tex.
Thrush & Co., H. A., Peru, Ind.
Trane Co., The, La Crosse, Wis.
Triplex Heating Specialty Co., Inc., Peru, Ind.
Tryco Products, Inc., Westfield, Mass.
Watson & McDaniel Co., Philadelphia, Pa.
Watts Regulator Co., Lawrence, Mass.
Welsbach Corp., The, Kitson Div., Philadelphia, Pa.

VALVES, RELIEF, HOT WATER, PRESSURE OPERATED, SELF-FILLING

Bailey Co., Chas. M., San Francisco, Calif.
Beaton & Cadwell Mfg. Co., New Britain, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Crane Co., Chicago, Ill.
Kehm Corp., The, Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
Mueller Co., Decatur, Ill.
Sall Bros. Co., Rockford, Ill.
Sarcotherm Controls, Inc., New York, N. Y.
Thrush & Co., H. A., Peru, Ind.
Watts Regulator Co., Lawrence, Mass.

VALVES, RELIEF, HYDRAULIC

Ashton Valve Co., Wrentham, Mass.
Atlas Valve Co., Newark, N. J.
Blackhawk Mfg. Co., Milwaukee, Wis.
Cla-Val Co., Alhambra, Calif.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Foster Engineering Co., Union, N. J.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Golden-Anderson Specialty Co., Pittsburgh, Pa.
Keckley Co., O. C., Chicago, Ill.
Kunkle Valve Co., Ft. Wayne, Ind.
Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Lonergan Co., J. E., Philadelphia, Pa.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
Pantex Mfg. Corp., Hydraulic Div., Pawtucket, R. I.
Ross Valve Mfg. Co., Troy, N. Y.
Texsteam Corp., Houston, Tex.

VALVES, RELIEF, OIL

Altens Foundry & Machine Works, Inc., Lancaster, O.
American Car & Foundry Co., New York, N. Y.
Andale Co., Philadelphia, Pa.
Ashton Valve Co., Wrentham, Mass.
Atlas Valve Co., Newark, N. J.
Bailey Co., Chas. M., San Francisco, Calif.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Davis Regulator Corp., Chicago, Ill.
Durabla Mfg. Co., New York, N. Y.
Edward Valves, Inc., East Chicago, Ind.
Farris Engineering Corp., Palisades Park, N. J.
Fisher Governor Co., Marshalltown, Ia.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Greer Hydraulics, Inc., Brooklyn, N. Y.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hubbell Corp., Mundelein, Ill.
James-Pond-Clark, Pasadena, Calif.
Keckley Co., O. C., Chicago, Ill.
Klipfel Valves, Inc., Hamilton, O.
Kunkle Valve Co., Ft. Wayne, Ind.
Lancaster Heat Transfer Co., Inc., Brooklyn, N. Y.
Locke Regulator Co., Salem, Mass.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
Milwaukee Valve Co., Milwaukee, Wis.
Monarch Mfg. Works, Inc., Philadelphia, Pa.
Morrison Brothers Co., Dubuque, Ia.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Pantex Mfg. Corp., Hydraulics Div., Pawtucket, R. I.
Preferred Utilites Mfg. Corp., New York, N. Y.
Ross Valve Mfg. Co., Inc., Troy, N. Y.
Schade Valve Mfg. Co., Philadelphia, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Skinner Electric Valve Div., Norwalk, Conn.
Staples & Pfeiffer, San Francisco, Calif.
Texsteam Corp., Houston, Tex.
Thermix Corp., The, Greenwich, Conn.
Watson & McDaniel Co., Philadelphia, Pa.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, SADDLE

Beckett & Co., Inc., Thomas, Dallas, Tex.
Darling Valve & Mfg. Co., Williamsport, Pa.
Fairbanks Co., The, New York, N. Y.
Imperial Brass Mfg. Co., Chicago, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Maid-O'-Mist, Inc., Chicago, Ill.
McDonnell & Miller, Inc., Chicago, Ill.
Ohio Injector Co., Wadsworth, O.
Walworth Co., New York, N. Y.

VALVES, SAFETY CLEANOUT

Petrometer Corp., Long Island City, N. Y.

VALVES, SAFETY, STEAM

American Car & Foundry Co., New York, N. Y.
Ashton Valve Co., Wrentham, Mass.
Crane Co., Chicago, Ill.
Crosby Steam Gage & Valve Co., Wrentham, Mass.
Eclipse Fuel Engineering Co., Rockford, Ill.
Farris Engineering Corp., Palisades Park, N. J.
Foster Engineering Co., Union, N. J.
Keckley Co., O. C., Chicago, Ill.
Kunkle Valve Co., Ft. Wayne, Ind.
Lonergan Co., J. E., Philadelphia, Pa.
Lunkenheimer Co., Cincinnati, O.
Manning, Maxwell & Moore, Inc., Stratford, Conn.
Marine & Industrial Products Co., Philadelphia, Pa.
North American Mfg. Co., Cleveland, O.
Powell Co., Wm., Cincinnati, O.
Scott Valve Mfg. Co., Detroit, Mich.
Texsteam Corp., Houston, Tex.

VALVES, SLIDE

Altens Foundry & Machine Works, Inc., Lancaster, O.
Barksdale Valves, Los Angeles, Calif.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Faber Engineering Co., Inc., Philadelphia, Pa.
General Ceramics & Steatite Corp., Keasbey, N. J. (chemical stone ware)
J O Mfg. Co., South Gate, Calif.
Morganite, Inc., Carbon Specialties Div., Long Island City, N. Y.
Ohio Injector Co., Wadsworth, O.
R-S Products Corp., Philadelphia, Pa.
Rockwell Co., W. S., Fairfield, Conn.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, SOLDER JOINT

American Brass Co., Waterbury, Conn.
Chase Brass & Copper Co., Waterbury, Conn.
Cleveland Brass Mfg. Co., The, Cleveland, O.
Crane Co., Chicago, Ill.
Darling Valve & Mfg. Co., Williamsport, Pa.
Fairbanks Co., The, New York, N. Y. (silver braze joints)
Hammond Brass Works, Hammond, Ind.
Henry Valve Co., Melrose Park, Ill.
Imperial Brass Mfg. Co., Chicago, Ill.
Jenkins Bros., New York, N. Y.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kerotest Mfg. Co., Pittsburgh, Pa.
Mueller Brass Co., Port Huron, Mich.
Northern Indiana Brass Co., Elkhart, Ind.
Ohio Brass Co., Mansfield, O.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Powell Co., Wm., Cincinnati, O.
R-P & C Valve Div., Reading, Pa.
Scott Valve Mfg. Co., Detroit, Mich.
Walworth Co., New York, N. Y. (Brazed)

VALVES, SOLENOID

A-P Controls Corp., Milwaukee, Wis.
Alco Valve Co., St. Louis, Mo.
Atkomatic Valve Co., Indianapolis, Ind.
Automatic Switch Co., Orange, N. J.
Barber-Colman Co., Rockford, Ill.
Barksdale Valves, Los Angeles, Calif.
Bellows Co., The, Akron, O.
Cla-Val Co., Alhambra, Calif.
Cooper Co., Clark, Palmyra, N. J.
Copes-Vulcan Div., Continental Foundry & Machine Co., Erie, Pa.
Cutler-Hammer, Inc., Milwaukee, Wis.
Davis Regulator Co., Chicago, Ill.
Detroit Controls Corp., The, Detroit, Mich.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., Skokie, Ill.
Erickson Specialty Co., Cohoes, N. Y.
Frick Co., Waynesboro, Pa.
General Controls Co., Glendale, Calif.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Golden-Anderson Valve Specialty Co., Pittsburgh, Pa.
Grove Regulator Co., Oakland, Calif.
Hanna Engineering Wks., Chicago, Ill.
Hasco Valve & Machine Co., Milwaukee, Wis. (alloy)
Hays Mfg. Co., Erie, Pa.
Hook & Ackerman, Inc., New York, N. Y.
Hubbell Corp., Mundelein, Ill.
Hunt & Son, Inc., C. B., Salem, O.
Johnson Corp., The, Three Rivers, Mich.
Keckley Co., O. C., Chicago, Ill.
Lammert & Mann Co., Chicago, Ill. (Gas safety shut-off)
Ledeen Mfg. Co., Los Angeles, Calif.
Locke Regulator Co., Salem, Mass.
McDonnell & Miller, Inc., Chicago, Ill.
McQuay-Norris Mfg. Co., St. Louis, Mo.
McRae Valve Co., Los Angeles, Calif.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Philadelphia.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Paul Valve Corp., New York, N. Y.
Penn Controls, Inc., Goshen, Ind.
Perfex Corp., Milwaukee, Wis.
Pfening Co., Fred D., Columbus, O. (water and steam)
R-S Products Corp., Philadelphia, Pa.
Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarco Co., Inc., New York, N. Y.
Sarcotherm Controls, Inc., New York, N. Y.
Skinner Electric Valve Div., Norwalk, Conn.
Soreng Mfg. Co., Schiller Park, Ill.
Sporlan Valve Co., St. Louis, Mo.
Square D Co., Industrial Controller Div., Milwaukee, Wis.
Superior Controls Co., Inc., Los Angeles, Calif.
Supreme Electric Products Corp., Rochester, N. Y.
Taylor-Winfield Corp., Warren, O.
Vacuum Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Vapor Heating Corp., Chicago, Ill.
White-Rodgers Electric Co., St. Louis, Mo.

VALVES, 2, 3 AND 4 WAY

Alco Valve Co., St. Louis, Mo.
Altens Foundry & Machine Works, Inc., Lancaster, O.
American Car & Foundry Co., New York, N. Y.
Automatic Switch Co., Orange, N. J.
Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Barber-Colman Co., Rockford, Ill.
Barksdale Valves, Los Angeles, Calif.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., Philadelphia, Pa.
Bellows Co., The, Akron, O.
Black-Sivalls & Bryson, Inc., Kansas City, Mo.
Bordo Co., Inc., L. J., Glenside, Pa.
Bristol Co., The, Waterbury, Conn.
Cash Co., A. W., Decatur, Ill.
Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Clark Controller Co., Cleveland, O.
Cla-Val Co., Alhambra, Calif.
Cooper Co., Clark, Palmyra, N. J.
Crane Co., Chicago, Ill.
Davis Engineering Corp., Elizabeth, N. J.
Davis Regulator Co., Chicago, Ill.
Detroit Brass & Malleable Works, Detroit, Mich.
Detroit Controls Corp., The, Detroit, Mich.
De Zurik Shower Co., Sartell, Minn.
Duriron Co., Inc., The, Dayton, O. (acid resisting)
Fisher Governor Co., Marshalltown, Ia.
General Controls Co., Glendale, Calif.
Grove Regulator Co., Oakland, Calif.
Hammel-Dahl Co., Providence, R. I.
Hanna Engineering Wks., Chicago, Ill.
Henry Valve Co., Melrose Park, Ill.
Homestead Valve Mfg. Co., Coraopolis, Pa.
Hunt & Son, Inc., C. B., Salem, O.
Imperial Brass Mfg. Co., Chicago, Ill.
Johnson Service Co., Milwaukee, Wis.
Keller Tool Co., Grand Haven, Mich.
Kerotest Mfg. Co., Pittsburgh, Pa.
Luzerne Rubber Co., Trenton, N. J. (Hard rubber)
Mercoid Corp., Chicago, Ill.
Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mueller Steam Specialty Co., Inc., Long Island City, N. Y.
Nicholson & Co., W. H., Wilkes-Barre, Pa.
Nordstrom Valve Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Penn Controls, Inc., Goshen, Ind.
Powell Co., Wm., Cincinnati, O.
Powers Regulator Co., Skokie, Ill.
R-S Products Corp., Philadelphia, Pa.
R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Rockwell Co., W. S., Fairfeld, Conn.
Rockwell Mfg. Co., Meter and Valve Div., Pittsburgh, Pa.
Ruggles-Klingemann Mfg. Co., Boston, Mass.
Sarcotherm Controls, Inc., New York, N. Y.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Shank Co., Cyrus, Chicago, Ill.
Skinner Electric Valve Div., Norwalk, Conn.
Spence Engineering Co., Inc., Walden, N. Y.
Taylor Instrument Companies, Rochester, N. Y.
Taylor-Winfield Corp., Warren, O.
Wach Co., E. H., The, Chicago, Ill.
Walworth Co., New York, N. Y. (Lubricated plug valves)
Warren Engineering Co., Broadway, N. J.
Weatherhead Co., The, Cleveland, O.
Williams Valve Co., D. T., Div. of The Schaible Co., Cincinnati, O.
Whittaker Co., Wm. R., Los Angeles, Calif.

VALVES, WATER GAGE

New York Air Valve Corp., Brooklyn, N. Y.
Reliance Guage Column Co., Cleveland, O.
Superior Controls Co., Inc., Los Angeles, Calif.

VANES, DUCT TURNING, PREFABRICATED

Anemostat Corp. of America, New York, N. Y. (Equalizing deflectors)
Barber-Colman Co., Rockford, Ill.
Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Titus Mfg. Corp., Waterloo, Ia.
Tuttle & Bailey, Inc., New Britain, Conn.

VAPOR HEATING SYSTEMS

See Systems, Heating, Vapor

VAPORIZERS FOR PROPANE — BUTANE

Davis Engineering Corp., Elizabeth, N. J.
Mitchell Co., John E., Dallas, Tex.

VARIABLE SPEED DRIVES

See Changers, Speed, Hydraulic Coupling; Changers, Speed, Mechanical; Reducers, Speed; Pulleys and Sheaves, for Belt Drives

VARIABLE SPEED PULLEYS

See Changers, Speed, Mechanical

V-BELT DRIVES

See Drives, V-Belt

VELOCITY REGULATORS

See Regulators, Air Velocity

VENT FLUE CAPS

See Caps, Vent Flue

VENTILATING HOSE

See Ducts and Duct Fittings, Prefabricated, Non-Metallic

VENTILATION HEATERS

See Surface, Finned, Heating; Ventilators, Roof, Fan; Ventilators, Unit

VENTILATORS, MUSHROOM

Carnes Co., W. R., Verona, Wis.
Chicago Blower Corp., Franklin Park, Ill.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dickinson, Aeolus, Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Knight, Maurice A., Akron, O. (Stoneware)
Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Lumm Co., A. H., Toledo, O
Muckle Mfg. Co., Owatonna, Minn.
Penn Ventilator Co., Philadelphia, Pa.
Van Noorden Co., E., Boston, Mass.

VENTILATORS, ROOF, FAN

Acme Equipment Co., Muskogee, Okla.
Aerovent Fan Co., Inc., Piqua, O.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Allen Ventilator Div., Production Planning Co., Rochester, Minn.
American Blower Corp., Detroit, Mich.
American Coolair Corp., Jacksonville, Fla.
American-Larson Ventilation Co., Pittsburgh, Pa.
American Steel Band Co., Pittsburgh, Pa.
Ammerman Co., C. L., Minneapolis, Minn.
Arex Co., Chicago, Ill.
Bar-Brook Mfg. Co., Inc., Shreveport, La.
Bertram Co., Harvey P., The, Cincinnati, O.
Bishop & Babcock Mfg. Co., Cleveland, O.
Breidert Co., G. C., Los Angeles, Calif.
Burt Mfg. Co., Akron, O.
Carnes Co., W. R., Verona, Wis.
Century Fan & Ventilator Co., Stamford, Conn.
Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Chicago Blower Corp., Franklin Park, Ill.
Clay Equipment Corp., Cedar Falls, Ia.
Dana Fan & Blower Corp., Cincinnati, O.
Davidson Hyduty Roof Fan Co., Newton, Mass.
De Bothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Dickinson, Aeolus, Chicago, Ill.
Diehl Mfg. Co., Somerville, N. J.
Electrovent Fan & Mfg. Co., Chicago, Ill.
Emerson Electric Mfg. Co., The, St. Louis, Mo.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Gallaher Co., The, Owatonna, Minn., & Omaha, Neb.
Gehri Co., Tacoma, Wash.
General Blower Co., Morton Grove, Ill.
Hartzell Propeller Fan Co., Piqua, O.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Ilg Electric Ventilating Co., Chicago, Ill.
International Engineering, Inc., Dayton, O.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Iron Lung Ventilator Co., Cleveland, O.
Jeffrey Mfg. Co., Columbus, O.
Jenn Air Products Co., Indianapolis, Ind.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
King Co., The, Owatonna, Minn.
Lee & Son Co., Thomas, Cincinnati, O.
Lumm Co., A. H., Toledo, O
Martin Fan & Blower Co., Chicago, Ill.
Mefco Mfg. Co., Air Conditioning Div., Glendale, Calif.
Mountain States Equipment Co., Denver, Colo.
Muckle Mfg. Co., Owatonna, Minn.
Nelson, Herman, Products, American Air Filter Co., Inc., Louisville, Ky.
New York Blower Co., Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Octagon Ventilator Co., Chicago, Ill.
Paasche Airbrush Co., Chicago, Ill.
Peerless Electric Co., Warren, O.
Penn Ventilating Co., Philadelphia, Pa.
Phoenix Ventilator Co., Inc., Brooklyn, N. Y.
Propellair Div., Robbins & Myers Inc., Springfield, O.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
Somers, Inc., H. J., Detroit, Mich.
South Bend Air Products, Inc., South Bend, Ind.
Swartwout Co., The, Cleveland, O.
Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Trane Co., The, La Crosse, Wis.
Tripar Products, Inc., Royal Oak, Mich.
Truflo Fan Co., Harmony, Pa.
Uno Ventilator Co., Malden, Mass.
Utility Appliance Corp., Los Angeles, Calif.
Van Noorden Co., E., Boston, Mass.
Washburne & Co., E. G., New York, N. Y.
Waverly Heating Supply Co., Boston, Mass.
Western Engineering & Mfg. Co., Venice, Calif.
Wind-Way Fan & Ventilator Co., New Orleans, La.
Wing Mfg. Co., L. J., Linden, N. J.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.

VENTILATORS, ROOF, GRAVITY

Accurate Sheet Metal Mfg. Works, Chicago, Ill.
Air Control Products, Inc., Coopersville, Mich.
Air Devices, Inc., New York, N. Y.
Airjet Ventilator Co., Pasadena, Calif.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., Cincinnati, O.
Allen Ventilator Div., Production Planning Co., Rochester, Mich.
American-Larson Ventilation Co., Pittsburgh, Pa.
American Sheet Metal Works, New Orleans, La.
American Steel Band Co., Pittsburgh, Pa.
Ammerman Co., C. L., Minneapolis, Minn.
Arex Co., Chicago, Ill.
Autoforce Ventilating System, Boston, Mass.
Bertram Co., Harvey P., The, Cincinnati, O.
Breidert Co., G. C., Los Angeles, Calif.
Burt Mfg. Co., Akron, O.
Century Fan & Ventilator Co., Stamford, Conn.
Clay Equipment Corp., Cedar Falls, Ia.
Danzer Metal Works Co., Hagerstown, Md.
Dickinson, Aeolus, Chicago, Ill.
Empire Ventilation Equipment Co., Long Island City, N. Y.
Gehri Co., Tacoma, Wash.
Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Inland Steel Products Co., Milwaukee, Wis.
Iona Ventilator Co., Inc., Philadelphia, Pa.
Iwan Brothers, South Bend, Ind.
Jordan & Co., Inc., Paul R., Indianapolis, Ind.
King Co., The, Owatonna, Minn.
Klauer Mfg. Co., Dubuque, Ia.
Kleenaire Corp., Stevens Point, Wis.
La Crosse Steel Roofing & Corrugating Co., La Crosse, Wis.
Lee & Son Co., Thomas, Cincinnati, O.
Levow, David, New York, N. Y.
Lumm Co., A. H., Toledo, O.
Lyon, Conklin & Co., Inc., Baltimore, Md.
Moeschl-Edwards Corrugating Co., Inc., The, Cincinnati, O.
National Metal Fabricators, Chicago, Ill.
Newcomb-Detroit Co., Detroit, Mich.
Octagon Ventilator Co., Chicago, Ill.
Penn Ventilating Co., Philadelphia, Pa.
Phoenix Ventilator Co., Inc., Brooklyn, N. Y.
Pioneer Roofing & Sheet Metal Co., Muskogee, Okla.
Plasteel Products Co., Washington, Pa.
Puhl & Hepper Mfg. Co., Inc., St. Louis, Mo.
Riggin Metal Products, Inc., Kankakee, Ill.
Robertson Co., H. H., Pittsburgh, Pa.
Royal Ventilator Co., Philadelphia, Pa.
St. Paul Corrugating Co., St. Paul, Minn.
Sioux Steel Co., Sioux Falls, S. D.
Souther Iron Co., E. E., St. Louis, Mo.
Standard Ventilator Co., Lewisburg, Pa.
Swartwout Co., The, Cleveland, O.
Tierney Rotor Ventilator Co., Minneapolis, Minn.
Tiffin Eaves Trough Co., Tiffin, O.
Uno Ventilator Co., Malden, Mass.
Van Noorden Co., E., Boston, Mass.
Walker Jamar Co., Duluth, Minn.
Warner Ventilator Co., La Grange, Ind.
Waverly Heating Supply Co., Boston, Mass.
Western Engineering & Mfg. Co., Venice, Calif.
Willis Steel Corp., Galesburg, Ill.
Winkler & Sons, Inc., A. E., Milwaukee, Wis.
York Corrugating Co., York, Pa.

VENTILATORS, UNIT

American Blower Corp., Detroit, Mich.
Bayley Blower Corp., Milwaukee, Wis.
Gannon Co., Russell R., Co., Inc., The, Cincinnati, O.
Nelson, Herman, Products, American Air Filter Co., Inc., Louisville, Ky.
Nesbitt, Inc., John J., Philadelphia, Pa.
Trane Co., The, LaCrosse, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

VIBRATION ISOLATORS

See Absorbers, Vibration; Bases and Pads, Vibration Isolating; Hose, Metal and Fittings

VISCOSIMETERS

American Instrument Co., Inc., Silver Spring, Md.
Brabender Corp., Rochelle Park, N. J.
Bristol Co., The, Waterbury, Conn.
Brookfield Engineering Laboratories, Inc., Stoughton, Mass.
Daigger & Co., A., Chicago, Ill.
Electric Sprayit Co., The, Sheboygan, Wis.
Fischer & Porter Co., Hatboro, Pa.
Fish-Schurman Corp., New Rochelle, N. Y.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Giannini & Co., Inc., G. M., Pasadena, Calif.
Greiner Co., Emil, New York, N. Y.
Humboldt Mfg. Co., Chicago, Ill.
Scientific Instrument Co., Detroit, Mich.
Thomas Co., Arthur H., Philadelphia, Pa.
Ultra-Viscoson Corp., The, Hartford, Conn.
Will Corp., Rochester, N. Y.

VISES, PIPE

American Implement Co., Omaha, Neb.
American Pipe Tool Co., Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Austin Corp., Robert, Boston, Mass.
Beaver Pipe Tools, Inc., Warren, O. (Sawing—for tubing)
Billings & Spencer Co., Hartford, Conn.
Capewell Mfg. Co., Hartford, Conn.
Crown Die & Tool Co., Chicago, Ill.
Desmond-Stephens Mfg. Co., Urbana, O.
Erie Tool Wks., Erie, Pa.
Hollands Mfg. Co., Erie, Pa.
Munton Mfg. Co., Franklin Park, Ill.
Nye Tool Co., Chicago, Ill.
Reed Mfg. Co., Erie, Pa.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg. Co., St. Louis, Mo.
Toledo Pipe Threading Machine Co., Toledo, O.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Vanderman Mfg. Co., Willimantic, Conn.
Williams & Co., J. H., Buffalo, N. Y.
Yost Mfg. Co., Meadville, Pa.

WASHERS, AIR

Air & Refrigeration Corp., New York, N. Y.
Alton Mfg. Co., Dallas, Tex.
American Blower Corp., Detroit, Mich.
Bahnson Co., Winston-Salem, N. C.
Bayley Blower Co., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Blower Application Co., Milwaukee, Wis.
Buensod-Stacey, Inc., New York, N. Y.
Buffalo Forge Co., Buffalo, N. Y.
Carrier Corp., Syracuse, N. Y.
Centri-Spray Corp., Detroit, Mich. (Wet type)
Clarage Fan Co., Kalamazoo, Mich.
Columbus Heating & Ventilating Co., Columbus, O.
Comfort Products Corp., Dallas, Tex.
Continental Air Filters, Inc., Louisville, Ky.
Drying Systems, Inc., Chicago, Ill.
Ducon Co., Mineola, N. Y.
Economy Equipment Co., Chicago, Ill.
Kauffman Air Conditioning Corp., St. Louis, Mo.
Marlo Coil Co., St. Louis, Mo.
Mountain States Equipment Co., Denver, Colo.
Parks-Cramer Co., Fitchburg, Mass.
Peters-Dalton, Inc., Detroit, Mich.
Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.
Schmieg Industries, Detroit, Mich.
Spray Engineering Co., Somerville, Mass.
Strandwitz & Co., Inc., W. J., Camden, N. J.
Surface Combustion Corp., Toledo, O.
Tenney Engineering, Inc., Newark, N. J.
Trane Co., The, LaCrosse, Wis.
Utility Appliance Corp., Los Angeles, Calif.
Vilter Mfg. Co., Milwaukee, Wis.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
York Corp., York, Pa.

WASHERS, FUME

Aqua-Therm, Inc., Dayton, O.
Ducon Co., Mineola, N. Y.
Heil Process Equipment Corp., Cleveland, O.
Knight, Maurice A., Akron, Ohio

WATER TREATMENT

See Treatment, Water, to Inhibit Corrosion; Devices, Electrolytic, for Preventing Corrosion

WELD TESTING MACHINES

See Machines, Testing, Weld

WELDERS, ARC

Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Birdsell Mfg. Co., Inc., Palo Alto, Calif.
Borm Mfg. Co., Elgin, Ill.
Eisler Engineering Co., Inc., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Ergolyte Mfg. Co., Philadelphia, Pa.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Fern, Ralph, Scranton, Pa.
General Electric Co., Apparatus Sales Div., Schenectady, N. Y.
Glenn-Roberts Co., Inc., Indianapolis, Ind.
Greyhound A. C. Arc Welder Corp., Brooklyn, N. Y.
Hammett Electric Mfg. Co., Kansas City, Mo.
Hampton Electric Mfg. Co., Pittsburgh, Pa.
Harnischfeger Corp., Milwaukee, Wis.
Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.
Hobart Bros. Co., Troy, O.
Kern Co., John A., Chicago, Ill.
Lee Co., K. O., Aberdeen, S. D.
Lincoln Electric Co., Cleveland, O.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y. (Inert gas-shielded)
Marquette Mfg. Co., Minneapolis, Minn.
Metal & Thermit Corp., New York, N. Y.
Mid-States Welder Mfg. Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
National Cylinder Gas Co., Chicago, Ill.
Niagara Machine & Tool Wks., Buffalo, N. Y.
Precision Welder Mfg. Co., Chicago, Ill.
Smith Corp., A. O., Milwaukee, Wis.
Smith Welding Equipment Corp., Minneapolis, Minn.
Trindl Products, Ltd., Chicago, Ill.
Tweco Products Co., Wichita, Kan. (Cable connectors, electrode holders and accessories)
U. S. Electric Welder Corp., Toledo, O.
Welding Apparatus Co., Chicago, Ill.
Westinghouse Electric Corp., Pittsburgh, Pa.
Will-Weld Mfg. Co., Inc., Omaha, Neb.

WELDERS, SPOT

Acme Electric Welder Co., Los Angeles, Calif.
Acro Welder Mfg. Co., Milwaukee, Wis.
Agnew Electric Co., Milford, Mich.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Alphil Spot Welding Co., Brooklyn, N. Y.
Birdsell Mfg. Co., Inc., Palo Alto, Calif.
Doall Co., The, Des Plaines, Ill.
Eisler Engineering Co., Inc., Newark, N. J.
Electric Arc, Inc., Newark, N. J.
Federal Machine & Welder Co., The, Warren, O.
Fern, Ralph, Scranton, Pa.
Greyhound A. C. Arc Welder Corp., Brooklyn, N. Y.
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y. (Inert gas-shielded arc)
Micro Products Co., Chicago, Ill.
Mid-States Welder Mfg. Co., Chicago, Ill.
Miller Electric Mfg. Co., Inc., Appleton, Wis.
Peer, Inc., Benton Harbor, Mich.
Rex Welder & Engineering Co., Kansas City, Mo.
Sciaky Bros., Inc., Chicago, Ill.
Taylor-Winfield Corp., Warren, O.
Thomson Electric Welder Co., Lynn, Mass.
Universal Power Corp., Cleveland, O.
Weldex, Inc., Detroit, Mich.

WELDERS, STUD

Federal Machine & Welder Co., The, Warren, O.
Nelson Stud Welding, Gregory Industries, Inc., Lorain, O.
Powder Power Tool Corp., Portland, Ore.

WELDING AND CUTTING APPARATUS, OXY-ACETYLENE

Air Reduction Sales Co., New York, N. Y.
Allied Weld-Craft, Inc., Indianapolis, Ind.
Arcos Corp., Philadelphia, Pa. (arc-oxygen)
Atlas Welding Accessories Co., Ferndale, Mich. (Weld cleaning tools)
Dockson Corp., Detroit, Mich.
Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Galv-Weld Products, Lima, O. (Regalvanizing process)
General Scientific Equipment Co., Philadelphia, Pa.
Goss Gas, Inc., Pittsburgh, Pa.
Harris Calorific Co., The, Cleveland, O.
Industrial Gas Div., The Liquid Carbonic Corp., Chicago, Ill.
Johnson Machine Works, Eau Claire, Wis. (rotary work aligner)
Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Liquid Carbonic Corp., The, Chicago, Ill.
Marquette Mfg. Co., Minneapolis, Minn.
Modern Engineering Co., St. Louis, Mo.
National Cylinder Gas Co., Chicago, Ill.
Powder Weld Process Co., The, Brooklyn, N. Y.
Sight Feed Generator Co., West Alexandria, O. (portable and stationary acetylene generators)
Smith Welding Equipment Corp., Minneapolis, Minn.
Tru-Line Corp., Santa Monica, Calif. (Protractor for marking pipe)
Victor Equipment Co., Welding Equipment Div., San Francisco, Calif.
Worthington Corp., Dunellen, N. J. (Welding positioner)

WELDING FUME COLLECTORS

See Exhausters, Welding Fume

WHEELS, BLOWER

Advance Aluminum Castings Corp., Chicago, Ill.
Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Bayley Blower Co., Milwaukee, Wis.
Bishop & Babcock Mfg. Co., Cleveland, O.
Burden Div., Torrington Mfg. Co., Los Angeles, Calif.
Carolina Blower Co., Inc., Greensboro, N. C.
Champion Blower & Forge Co., Lancaster Pa.
Clarage Fan Co., Kalamazoo, Mich.

General Blower Co., Morton Grove, Ill.
Hastings Air Conditioning Co., Hastings, Neb.
Jaden Mfg. Co., Hastings, Neb.
Jan-Air, Inc., Richmond, Ill.
Lau Blower Co., Dayton, O.
Martin Fan & Blower Co., Chicago, Ill.
Mayne Products Co., Dayton, O.
Morrison Products, Inc., Cleveland, O.
New York Blower Co., Chicago, Ill.
Palmer Mfg. Corp., Phoenix, Ariz.
Peerless Electric Co., Warren, O.
Revcor, Chicago, Ill.
Schwitzer-Cummins Co., Indianapolis, Ind.
Torrington Mfg. Co., The, Western Div., Van Nuys, Calif.
Torrington Mfg. Co., Torrington, Conn.
Triangle Mfg. Co., Oshkosh, Wis.
United States Air Conditioning Corp., Minneapolis, Minn.
Utility Appliance Corp., Los Angeles, Calif.
Western Blower Co., Seattle, Wash.
Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

WINDOWS, HEAT INSULATING

Anderson Corp., Bayport, Minn.
Chamberlin Co. of America, Detroit, Mich.
Ingersoll Products Div., Borg-Warner Corp., Chicago, Ill.
Kane Mfg. Corp., Kane, Pa.
Libbey-Owens-Ford Glass Co., Toledo, O.
Mississippi Glass Co., New York, N. Y.
Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Russell Co., F. C., The, Cleveland, O.

WIRE, ELECTRIC, NUMBERED, FOR CONTROL SYSTEMS

Chester Cable Corp., Chester, N. Y.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo, O.
Midwest Automatic Control Co., Des Moines, Ia.

WIRE, INSTRUMENT

Chester Cable Corp., Chester, N. Y.

WIRE, OIL BURNER IGNITION

Chester Cable Corp., Chester, N. Y.

WIRING, COMPLETE ASSEMBLIES, CUSTOM-MADE

Chester Cable Corp., Chester, N. Y.
Cornish Wire Co., New York, N. Y.

WRENCHES, PIPE

American Machine Wks., Inc., Racine, Wis.
Armstrong Bros. Tool Co., Chicago, Ill.
Roddick Tool Co., Anaheim, Calif.
Billings & Spencer Co., Hartford, Conn.
Bonney Forge & Tool Works, Allentown, Pa.
Clark Bros. Mfg. Co., Hillsboro, Ore.
Erie Tool Works, Erie, Pa.
Fairmount Tool & Forging, Cleveland, O.
Frontier Bronze Corp., Niagara Falls, N. Y.
Lowell Wrench Co., Worcester, Mass.
Lurie & Lurie, Chicago, Ill.
Nye Tool Co., Chicago, Ill.
Peck, Stow & Wilcox Co., Southington, Conn.
Ridge Tool Co., Elyria, O.
Sac Tool Mfg Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.
Walworth Co., New York, N. Y.

WRENCHES, RATCHET

Armstrong Bros. Tool Co., Chicago, Ill.
Billings & Spencer Co., Hartford, Conn.
Blackhawk Mfg. Co., Milwaukee, Wis.
Bonney Forge & Tool Works, Allentown, Pa.
Duro Metal Products Co., Chicago, Ill.
Greene, Tweed & Co., North Wales, Pa.
J O Mfg. Co., South Gate, Calif.
Lowell Wrench Co., Worcester, Mass.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Tubing Appliance Co., Los Angeles, Calif.
William & Co., J. H., Buffalo, N. Y.

WRENCHES, TORQUE INDICATING

Ammco Tools, Inc., North Chicago, Ill.
Armstrong Bros. Tool Co., Chicago, Ill.
Blackhawk Mfg. Co., Milwaukee, Wis.
Bonney Forge & Tool Works, Allentown, Pa.
Duro Metal Products Co., Chicago, Ill.
J O Mfg. Co., South Gate, Calif.
Richmont, Inc., San Gabriel, Calif.
Sac Tool Mfg. Co., St. Louis, Mo.
Snap-on Tools Corp., Kenosha, Wis.
Sturtevant Co., P. A., Addison, Ill.
Williams & Co., J. H., Buffalo, N. Y.

X-RAY MACHINES AND FILM

See Machines and Film, X-Ray

ZONE CONTROLS

See Systems, Heating, Zone Control

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 2—TRADE NAMES

A-B—Motor controllers. Allen-Bradley Co., Milwaukee, Wis.
ABC—Humidifiers, dust collectors, unit coolers. American Blower Corp., Detroit, Mich.
A-C—Water treatment. Elgin Softener Corp., Elgin, Ill.
ACB—Coatings. Tropical Paint & Oil Co., Cleveland, O.
A/C Range—Filters. American Air Filter Co., Inc., Louisville, Ky.
A.P.S. Plasteel—Metal sheets. Plasteel Products Co., Washington, Pa.
A & R—Dehumidifiers. Air & Refrigeration Corp., New York, N. Y.
A.R.A.—Non-metallic sheets and board. Grant Wilson, Inc., Chicago, Ill.
ARRC—Couplings, fittings, flanges, unions. Union Metal Wks., Chelsea, Mass.
ASBO—Ventilators, louvers and shutters. American Steel Band Co., Pittsburgh, Pa.
Abrasoweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Abso-Lute—Cement and compounds. Key Co., East St. Louis, Ill.
Accordion—Insulation. Infra Insulation, Inc., New York, N. Y.
Ace—Dampers. Martens & Stormoen, Boston, Mass.
Ace—Fittings, pipe, protective coatings, pumps, tanks, valves. American Hard Rubber Co., New York, N. Y.
Ace—Welders. Peer, Inc., Benton Harbor, Mich.
Ace Parian—Fittings, pipe. American Hard Rubber Co., New York, N. Y.
Ace-Saran—Pipe, tubing. American Hard Rubber Co., New York, N. Y.
Acolite—Enamels and lacquers. Acorn Refining Co., Cleveland, O.
Acousteel—Insulation. Celotex Corp., The, Chicago, Ill.
Acousti-Celotex—Insulation. Celotex Corp., The, Chicago, Ill.
Acoustilite—Insulation. Insulite Co., Minneapolis, Minn.
Acratherm—Thermostats. Minneapolis-Honey-Well Regulator Co., Minneapolis, Minn.
Actex—Heat exchangers. Wabash Mfg. Co., Chicago, Ill.
Adamant—Furnace cement. Botfield Refractories Co., Philadelphia, Pa.
Adastic—Insulating cement. Botfield Refractories Co., Philadelphia, Pa.
Adjust-O-Feeder—Feeders, pumps, water treatment. % Proportioneers, Inc. %, Providence, R. I.
Adjustor—Heating systems. The Kehm Corp., Chicago, Ill.
Adsco—Coils, regulators, coolers, exchangers, heaters, joints, meters, pipe hangers and supports, pipe protectors, separators, sight glasses, strainers, regulators, valves. American District Steam Co., Inc., North Tonawanda, N. Y.
Adsco Dual—Traps. American District Steam Co., Inc. North Tonawanda, N. Y.
Adsco Rotary—Condensation meters. American District Steam Co., Inc., North Tonawanda, N. Y.
Aemco—Relays, switches. Automatic Electric Mfg. Co., Mankato, Minn.
Aeracool—Blades, fans, louvers and shutters. Myers Electric Co., Inc., Pittsburgh, Pa.
Aerisweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Aero—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.
Aero—Aftercoolers, heat exchangers. Niagara Blower Co., New York, N. Y.
Aero—Radiation. National Radiator Co., The, Johnstown, Pa.
Aerocot—Insulation. Owens-Corning Fiberglas Corp., Toledo, O.
Aerodyne—Fans. Jeffrey Mfg. Co., Columbus, O.
Aerodyne—Collectors. Green Fuel Economizer Co., Beacon, N. Y.
Aerofuse—Air diffusers. Tuttle & Bailey, Inc., New Britain, Conn.
Aerolux—Air conditioning units. Johnson Co., S. T., Philadelphia, Pa.
Aeromaster—Propeller fans. Aeromatic Propeller Dept., Koppers Co., Inc., Baltimore, Md.
Aeromatic Exhauster—Ventilators. Octagon Ventilator Co., Chicago, Ill.
Aeropass—Condensers. Niagara Blower Co., New York, N. Y.
Aeropel—Ventilators. American Blower Corp., Detroit, Mich.
Aeroplane—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.
Aeroplex—Fans. Bayley Blower Co., Milwaukee, Wis.
Aeropull—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.
Aero Seal—Packing. Chicago Belting Co., Chicago, Ill.
Aerospot—Fans. South Bend Air Products, Inc., South Bend, Ind.
Aerotec—Cleaners, collectors, separators, switches, valves. Thermix Corp., The, Greenwich, Conn.
Aerovane—Anemometers. Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Aerovane—Grilles, registers. Tuttle & Bailey, Inc., New Britain, Conn.
Afco—Heaters. American Furnace Co., St. Louis, Mo.
Affco—Louvers and shutters. American Foundry & Furnace Co., Bloomington, Ill.
Agastat—Time switches, electrical relays. American Gas Accumulator Co., Elizabeth, N. J.
Agile—Welding electrodes. American Agile Corp., Cleveland, O.
Agilene—Fittings, pipe, tubing, valves. American Agile Corp., Cleveland, O.
Agitair—Air diffusers, filters, heaters, meters, ventilators. Air Devices, Inc., New York, N. Y.
Airacoustic—Insulation. Johns-Manville, New York, N. Y.
Airate—Ventilators. Dickinson, Aeolus, Chicago, Ill.
Air Cell—Asbestos insulation. Keasbey & Mattison Co., Ambler, Pa.
Airco—Arc welders, welding rod, solder, pipe cutting machines, torches. Air Reduction Sales Co., New York, N. Y.
Air Control—Fans, heaters, unit air conditioners. Hastings Air Conditioning Co., Hastings, Neb.
Air-Con—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Airefiner—Water treatment. Oakite Products, Inc., New York, N. Y.
Airfuge—Separators. Swartwout Co., The, Cleveland, O.
Aire-Rectifier—Coolers. Lintern Corp., Painesville, O.
Airex—Air washers, fans, unit air conditioners, ventilators. Mountain States Equipment Co., Denver, Colo.
Air-flo—Louvers and shutters. Air Conditioning Products Co., Detroit, Mich.
Air Flow—Registers. The Louvra Corp., Union, N. J.
Airfoil—Fans, fan blades, ventilators. Aerovent Fan Co., Inc., Piqua, O.
Airfoil—Dampers, diffusers, grilles, registers. Titus Mfg. Corp., Waterloo, Ia.
Airgraph—Thermometers. Hausman Mfg. & Sales Co., Chicago, Ill.
Airguide—Hygrometers, indicators, thermometers. Fee and Stemwedel, Inc., Chicago, Ill.
Air Guide—Vanes. Titus Mfg. Corp., Waterloo, Ia.
Air Guide—Radiation. Rempe Co., Chicago, Ill.
Airidge—Ventilators. Dickinson, Aeolus, Chicago, Ill.
Airistocrat—Fan blades. Torrington Mfg. Co., Torrington, Conn.
Airjector—Ventilators. Swartwout Co., Cleveland, O.
Airlift—Ventilators. Swartwout Co., Cleveland, O.
Airliner—Fan blades. Burden Co., Alan E., Los Angeles, Calif.
Airlouver—Louvers and shutters. Swartwout Co., The, Cleveland, O.
Airmaster—Dehumidifiers. Haertel Co., Walter, Minneapolis, Minn.
Airmat Arrester—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.
Air Max—Ventilators. Gallaher Co., The, Omaha, Neb. & Owatonna, Minn.
Air Meter—Air velocity meters. Hastings Instrument Co., Inc., Hampton, Va.
Airmover—Ventilators. Swartwout Co., The, Cleveland, O.
Airocool—Air conditioning units. Mefco Mfg. Co., Air Cond. Div., Glendale, Calif.
Airocool—Burners. National Airoil Burner Co. Inc., Philadelphia, Pa.
Airo-Flex—Registers. Auer Register Co., Cleveland, O.
Airoflo—Ventilators. Mefco Mfg. Co., Air Conditioning Div., Glendale, Calif.
Airoil—Oil burners. National Airoil Burner Co., Inc., Philadelphia, Pa.
Air-O-Line—Pumps, valves. Beckett & Co., Inc., Thomas, Dallas, Tex.
Air-O-Matic—Air conditioning units. Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
Airotor—Blower wheels. Torrington Mfg. Co., Torrington, Conn.
Airout—Ventilators. Western Engineering & Mfg. Co., Venice, Calif.
Air-O-Vane—Diffusers. Krueger Air Conditioning Co., Tucson, Ariz.
Airovent—Gas Burners. National Airoil Burner Co., Inc., Philadelphia, Pa.
Airpak—Filters. Conoflow Corp., Philadelphia, Pa.
Air Rad—Radiation. Penn Boiler & Burner Corp., Lancaster, Pa.
Airsan—Filters. Air Filter Corp., Milwaukee, Wis.
Airstat — Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Airswitch—Thermostats, regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Airtrol—Air eliminators. Bell & Gossett Co., Morton Grove, Ill.
Airtron—Ducts and duct fittings, hose, insulation. Arrowhead Rubber Co., Downey, Calif.
Air-Tumbler—Dust collectors. Dust Suppression & Engineering Co., Lake Orion, Mich.
Airturn—Duct turning vanes. Barber-Colman Co., Rockford, Ill.
Airvalve—Ventilators. Swartwout Co., Cleveland, O.
Air-Van—Ventilators, exhausters. The Gallaher Co., Owatonna, Minn., Omaha, Neb.
Air-Wave—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Airxpel—Traps. Wright-Austin Co., Detroit, Mich.
Airxpeler—Roof ventilators, dampers, exhausters, centrifugal fans, louvers and shutters. Ammerman Co., G. L., Minneapolis, Minn.
Ajax—Gaskets, United States Gasket Co., Camden, N. J.
Akon—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Aktiv—Cleaning compounds. Turco Products, Inc., Los Angeles, Calif.
Alcalex—Water softeners. Research Products Corp., Madison, Wis.
Alco—Ventilators. Lumm Co., A. H., Toledo, O.
Alcoa—Angles, compounds, rods, dehydrators, electrodes, exchangers, pipe, sheets, tanks, tubing. Aluminum Co. of America, Pittsburgh, Pa.
Alcuplate—Clad sheets. General Plate Div., Metals & Controls Corp., Attleboro, Mass.
Alfol—Insulation. Reflectal Corp., New York, N. Y.
Algaecide—Water treatment. Western Chemical Co., Kansas City, Mo.
Allencote—Retractories and refractory cement. Allen Co., Robert G., Mechanicsville, N. Y.
Allenite—Soot destroyers. Allen Co., Robert G., Mechanicsville, N. Y.
All-Flex—Pipe joints, hose, packing. Gil-Lair Products, Inc., Pasadena, Calif.
All-In-One—Regulators. Bell & Gossett Co., Morton Grove, Ill.
All-Metl—Vibration isolating bases and pads. Barry Corp., Watertown, Mass.
All Purpose—Grilles. Louvra Corp., The, Union, N. J.
Allspeed Selector—Mechanical changers. Worthington Corp., Harrison, N. J.
Alnor—Anemometers, indicator controllers, thermometers. Illinois Testing Laboratories, Inc., Chicago, Ill.
Alodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Aloyco—Pipe, tubing, valves. Alloy Steel Products Co. Linden, N. J.
Alpine—Air conditioning units. International Metal Products Co., Phoenix, Ariz.
Allprene—Gaskets. Chicago Gasket Co., Chicago, Ill.
Alternarc—Arc welders. Electric Arc, Inc., Newark, N. J.
Alumaweld—Solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.

Aluminweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Alumiseal—Insulation. Hogan & Co., Inc., C. T., New York, N. Y.
A-Lum-O—Filters. Bard Mfg. Co., Bryan, O.
A-Lum-O—Filters. Carey Electronic Engineering Co., Metal Wool Div., Springfield, O.
Alundum—Grinders and grinding wheels. Norton Co., Worcester, Mass.
Always Reliable—Benders, cutters, torches, wrenches. Berns Co., Otto, Rochester, N. Y.
Amblerex—Insulating cement. Keasbey & Mattison Co., Ambler, Pa.
Amco—Protective coatings. American Solder & Flux Co., Philadelphia, Pa.
Amco—Humidifiers. Grinnell Co., Inc., Providence, R. I.
Amco—Control Systems, humidifiers, hygrometers, indicators, meters, nozzles, tanks, air conditioning units, psychrometers, valves. American Moistening Co., Providence, R. I.
Amcoil—Condensers, radiation, cooling and heating surfaces. American Coils Co., Newark, N. J.
Amer-glas—Air filters. Beck Mfg. Co., New Albany, Ind.
Amer-glas—Unit filters. American Air Filter Co., Inc., Louisville, Ky.
American—Absorbers, metal hose, tubing. American Metal Hose Branch, American Brass Co., The, Waterbury, Conn.
American—Couplings. American Flexible Coupling Co., Erie, Pa.
American—Furnaces, heaters. American Foundry & Furnace Co., Bloomington, Ill.
American—Recorders, hygrometers, indicator-controllers, manometers, regulators, valves, thermometers, transmitters. Manning, Maxwell & Moore, Inc., Stratford, Conn.
American—Meters. American Meter Co., Inc., New York, N. Y.
American—Speed reducers. American Pulley Co., Philadelphia, Pa.
American—Pumps, softeners, water filters, water treatment. American Well Works, Aurora, Ill.
American—Pipe benders. American Pipe Bending Machine Co., Inc., Poultney, Vt.
American—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Empire—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Exbrook—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American H/V—Unit Filters. American Air Filter Co., Inc., Louisville, Ky.
American Redflash-Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Standard—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
American Superfin—Heaters. American Foundry & Furnace Co., Bloomington, Ill.
American Water Tube—Boilers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Amerigear—Couplings. American Flexible Coupling Co., Erie, Pa.
Ameritherm—Heaters, air conditioning units. American Thermal Industries, Inc., Detroit, Mich.
Amesteam—Boilers. Ames Iron Works, Inc., Oswego, N. Y.
Aminco—Colorimeters, gage testers, Indicator-controllers, indicators, recorders, regulators, relays, viscosimeters. American Instrument Co., Inc., Silver Spring, Md.
Ammonoduct—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Amocel—Insulation. Union Asbestos & Rubber Co., Chicago, Ill.
Am-Pe-Co—Centrifugal fans. American Machine Products Co., Marshalltown, Ia.
Amtico—Heaters, air conditioning units. American Thermal Industries, Inc., Detroit, Mich.
Anaconda—Fittings, pipe, welding rod, sheets, solder, tubing, valves. American Brass Co., Waterbury, Conn.
Anemotherm—Direct reading meters. Anemostat Corp. of America, New York, N. Y.
Ankorite—Packing. Anchor Packing Co., Philadelphia, Pa.
Anthracite 1600—Water heaters. Catskill Metal Works, Inc., Catskill, N. Y.
Anti-Spatter—Welding compounds. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Anti-Sweat—Insulation. Johns-Manville, New York, N. Y.
Apco—Turbine type pumps, systems. Aurora Pump Co., Aurora, Ill.
Apeco—Blueprint machines. American Photocopy Equipment Co., Chicago, Ill.
Apex—Analyzers, recorders, indicators. Uehling Instrument Co., Paterson, N. J.
Apexior—Coatings. Dampney Co., The, Boston, Mass.
Apthorp—Nozzles. Boston Machine Works, Inc., Lynn, Mass.
Aqua-Clear—Water treatment. Sudbury Laboratory, South Sudbury, Mass.
AquaHeater—Heaters. Lewis & Co., Joseph E., Baltimore, Md.
Aqualator—Circulators. Triplex Heating Specialty Co., Inc., Peru, Ind.
Aquamizer—Condensers. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Aquanite—Enamels & lacquers. Atlas Powder Co., Industrial Finishes Dept., North Chicago, Ill.
Aquastat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Aqua-Tite—Seals. Schwitzer-Cummins Co., Indianapolis, Ind.
Aquatone—Treatment, steam and water. Ampion Corp., Long Island City, N. Y.
Aquatower—Cooling towers. Marley Co., Inc., The, Kansas City, Mo.
Aqulux—Heaters. Johnson Co., S. T., Philadelphia, Pa.
Arbest—Flanges, hangers, humidifiers, nipples, plates, valves. G & H Mfg. Co., Philadelphia, Pa.
Arc-Eng—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Arco—Packing. Chicago Belting Co., Chicago, Ill.
Arco—Hangers, radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Arco Sil—Hose. Arrowhead Rubber Co., Downey, Calif.
Arctic Circle—Air conditioning units. International Metal Products Co., Phoenix, Ariz.
Arex-Austor—Roof ventilators. Arex Co., Chicago, Ill.
Arid Air—Dehumidifiers. Tamms Industries, Inc., Chicago, Ill.
Arin—Louvers and shutters. Arex Co., Chicago, Ill.
Armaloy—Wrenches. Armstrong Bros. Tool Co., Chicago, Ill.
Armorak—Insulation. Keasbey Co., Robert A., New York, N. Y.
Arrowtrol—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Art—Direct radiation. The National Radiator Co., Johnstown, Pa.
Artcraft—Air heaters. Chicago Steel Furnace Co., Chicago, Ill.
Artic—Refrigerant. E. I. du Pont de Nemours & Co., Wilmington, Del.
Asbestocel—Insulation. Johns-Manville, New York, N. Y.
Asco—Valves, relays, switches. Automatic Switch Co., Orange, N. J.
Ashcroft—Gages, cocks, recorders, testers, transmitters. Manning, Maxwell & Moore, Inc., Stratford, Conn.
At-a-Glance—Gages. Krueger Sentry Gauge Co., Green Bay, Wis.
Atlas—Fans, furnaces, heaters. International Sales Co., San Francisco, Calif.
Atmoset—Cement. Green Fire Brick Co., Mexico, Mo.
Atomick—Humidifiers, nozzles. Maid-O'-Mist, Inc., Chicago, Ill.
Atomist—Humidifiers. American Foundry & Furnace Co., Bloomington, Ill.
Autocrat—Oil burners. Chandler Co., Cedar Rapids, Ia.
Autographs—Nameplate parts. Metalcraft Inc., Mason City, Ia.
Auto-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.
Autolite—Motors, wire, recorders, thermometers. Electric Autolite Co., Instrument & Gauge Div., Toledo, O.
Autolube—Bearings. International Powder Metallurgy, Inc., Ridgway, Pa.
Automatic Heat—Heaters. Heat Equipment not Inc., Chicago, Ill.
Autovent—Eliminators, humidifiers, valves. Maid-O'-Mist, Inc., Chicago, Ill.
Autronic—Recorders. Swartwout Co., The, Cleveland, Ohio.
Axivane—Blowers. Joy Mfg. Co., Pittsburgh, Pa.

B.A.C.—Condensers, oil coolers, cooling towers. Baltimore Aircoil Co., Inc., Baltimore, Md.
B. B.—Blast gates. Berger Bros. Co., Philadelphia, Pa.
B & B—Heating and air conditioning equipment. Bishop & Babcock Mfg. Co., Cleveland, O.
B & C—Plates, valves. Beaton & Corbin Mfg. Co., Southington, Conn.
BCA—Bearings. Bearings Co. of America, Lancaster, Pa.
B. & G.—Air eliminators, circulators, coolers, condensers, fittings, heat exchangers, heaters, heating systems, temperature regulators, tanks, valves. Bell & Gossett Co., Morton Grove, Ill.
B-H—Insulation. Baldwin-Hill Co., Trenton, N. J.
B-H—Insulating cement, pipe insulation. Baldwin-Hill Co., Trenton, N. J.
B-H Powerhouse—Insulation. Baldwin-Hill Co., Trenton, N. J.
B & J—Orifices, strainers, systems, traps, valves. Barnes & Jones, Inc., Boston, Mass.
B & K—Pipe cutting and threading machines. Bignall & Keeler, Div., John Ramming Machine Co., St. Louis, Mo.
B-Line—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.
B & P Enamel—Enamels and lacquers. Tropical Paint & Oil Co., Cleveland, O.
BRI Gun—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
B & W—Boilers, burners, desuperheaters, fuel economizers, refractories, stokers, superheaters. Babcock & Wilcox Co., New York, N. Y.
B & W—Pipes, tubes, and tubing. Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
B & W—Tubing. Babcock & Wilcox Tube Co., The, Tubular Products Div., Alliance, O.
Bacite—Insulation. Bird-Archer Co., Philadelphia, Pa.
Baco—Soot destroyer, pumps. Bird-Archer Co., Philadelphia, Pa.
Badger—Time switches. Reliance Automatic Lighting Co., Racine, Wis.
Baflex—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Bakeraire—Unit air conditioners. Baker Refrigeration Corp., South Windham, Me.
Balancer—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Baldwin-Rex—Couplings, chain drives. Chain Belt Co., Milwaukee, Wis.
Ball Bushings—Ball bearings. Thomson Industries, Inc., Manhasset, N. Y.
Balsam-Wool—Insulation. Wood Conversion Co., St. Paul, Minn.
Bankheat—Oil burners. Johnson Co., S. T., Philadelphia, Pa.
Barcol—Humidistats, motors, operators, regulators, thermostats, valves. Barber-Colman Co., Rockford, Ill.
Barnes—Cutters. Erie Tool Works, Erie, Pa.
Barreled Sunlight—Enamels. U.S. Gutta Percha Paint Co., Providence, R. I.
Barry—Bearings, pulleys and sheaves. Dick Co., Inc., R. & J., Passaic, N. J.
Barton-American—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Base Ray—Baseboard radiation. Burnham Corp., Boiler Div., Irvington, N. Y.
Basic Magnesite—Refractories. Basic Refractories, Inc., Cleveland, O.
Basifrit—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Bazooka—Torches. Industrial Engineered Products Co., Los Angeles, Calif.
Beacor—Valves. Beaton & Corbin Mfg. Co., Southington, Conn.
Beaverkill—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Beco-Cell—Corrosion treatment, scale removal. Brown Electro Co., Oklahoma City, Okla.
Belco—Fans, louvers and shutters. Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Bell-Pack—Clamps. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Beloit—Machines, punches, power shears. Hendley & Whittemore Co., Beloit, Wis.
Bermico—Fiber glass. Brown Co., Boston, Mass.
Bestfelt—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Beth-Co-Weld—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Beth-Cu-Loy—Sheets. Bethlehem Steel Co., Bethlehem, Pa.
Bi-Air—Burners. John Zink Co., Tulsa.
Bifurcator—Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Bildrite—Insulation. Insulite Co., Minneapolis, Minn.
Bilt-Rite—Doors and panels. Canton Stoker Corp., Canton, O.
Bi-Mix—Burners. John Zink Co., Tulsa, Okla.
Binoc—Thermometers. Taylor Instrument Companies, Rochester, N. Y.
Bison—Boilers. Farrar & Trefts, Buffalo, N. Y.
Bitumastic—Protective coatings. Koppers Co., Inc., Pittsburgh, Pa.
Bituminous—Bases and pads. Celotex Corp., The, Chicago, Ill.
Bituminous—Coatings. Robertson Co., H. H., Pittsburgh, Pa.
Bituplastic—Coatings. Koppers Co., Inc., Pittsburgh, Pa.
Black Baking Japans—Enamels and lacquers. Hilo Varnish Co., Brooklyn, N. Y.
Black Magic—Pipe covering adhesives, protective coatings. Miracle Adhesives Corp., New York, N. Y.
Black Magic—Cement and compounds. Bowser, Inc., Fort Wayne, Ind.
Blazecrete—Refractories. Johns-Manville, New York, N. Y.
Bloapco—Dust collectors. Blower Application Co., Milwaukee, Wis.
Blo-Cold—Unit coolers. Acme Industries, Inc., Jackson, Mich.
Bloflex—Hose. American Ventilating Hose Co., New York, N. Y.
Blowertrol—Speed changers. White Mfg. Co., St. Paul, Minn.
Blu-Cold—Compressors. Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.

Blue Circle—Heating boilers. Dunkirk Radiator Corp., Dunkirk, N. Y.
Blueknight—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Blue-Point—Cutters, Tools, wrenches. Snap-on Tools Corp., Kenosha, Wis.
Blue Ribbon—Headers and nipples. Chicago Nipple Mfg. Co., Cicero, Ill.
Boardman—Pump governors. Locke Regulator Co., Salem, Mass.
Bob—Float valves. Robert Mfg. Co., Los Angeles, Calif.
Boilergard—Low water cut-offs. Maid-O'-Mist, Inc., Chicago, Ill.
Boiler-Lox—Compounds. Radiator Specialty Co., Charlotte, N. C.
Boiler Solder Seal—Compounds. Radiator Specialty Co., Charlotte, N. Carolina.
Bosco—Clay pipe. Bowerston Shale Co., Bowerston, O.
Boston Standard—Draft controls. Boston Machine Works Co., Lynn, Mass.
Brad-Ray—Radiant heating coils and panels. Jos. L. Bradfield, Indianapolis, Ind.
Branford—Oil burners, unions. Malleable Iron Fittings Co., Branford, Conn.
Brassweld—Compounds. Sight Feed Generator Co., West Alexandria, O.
Brazo—Solder. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Breeze Master—Fans. Acme Equipment Co., Muskogee, Okla.
Breezo—Fans. Buffalo Forge Co., Buffalo, N. Y.
Breezy-Air—Air conditioning units. Barwick Mfg. Corp., Wichita, Kan.
Bronzende—Electrodes. Arcos Corp., Philadelphia, Pa.
Bronzeweld—Compounds. Sight Feed Generator Co., West Alexandria, O.
Brooklyn—Adhesive tape. Johns-Manville, New York, N. Y.
Brown-Heet—Heaters. Brown Products Co., Forest Hills, N. Y.
Brule—Incinerators. Goder Incinerator Corp., Chicago, Ill.
BTUnit—Unit heaters. Industrial Mfg. & Engineering Co., Chicago, Ill.
Budget—Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Bulator—Grilles. Hendrick Mfg. Co., Carbondale, Pa.
Bulldog—Bolts. Polis Mfg. Co., J. D., Chicago, Ill.
Bulldog—Shears and snips. Wiss & Sons Co., J., Newark, N. J.
Bull Dog—Stocks and dies. Oster Mfg. Co., Cleveland, O.
Bull Dog—Pipe and tubing. Phelps Dodge Copper Products, British American Tube Div., New York, N. Y.
Bull Dog—Valves. The Carpenter Mfg. Corp., Cleveland, O.
Bundyflex—Steel tubing. Everhot Products Co., Chicago, Ill.
Bundyweld—Tubes and tubing. Bundy Tubing Co., Detroit, Mich.
Bunker Hill—Fittings, pipe, sheets, solder. Northwest Lead Co., Seattle, Wash.
Burks—Pumps. Decatur Pump Co., Decatur, Ill.
Burnham—Compressors, condensers, pumps. Union Steam Pump Co., Battle Creek, Mich.

C E—Boilers, burners, stokers, fuel economizers. Combustion Engineering - Superheater, Inc., New York, N. Y.
C F B Super—Cement. Chicago Fire Brick Co., Chicago, Ill.
C-H—Alarms, controllers and starters, heaters, relays, regulators, switches, valves. Cutler-Hammer, Inc., Milwaukee, Wis.
C & M—Hangers or brackets, inserts. Carty & Moore Engineering Co., Detroit, Mich.
COM—Blowers. Wing Mfg. Co., L. J., New York, N. Y.
C & R—Regulators. Automatic Control Co., St. Paul, Minn.
CSP—Transformers. Westinghouse Electric Corp., Pittsburgh, Pa.
CW—Pipe. Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
Cadillac-Meters. Central Station Steam Co., Detroit, Mich.
Cadman—Valves. Barrett Machine Co., Pittsburgh, Pa.
Cadwell—Pressure regulators, valves. Beaton & Cadwell Mfg. Co., New Britain, Conn.
Calco—Valves. California Brass Mfg. Co., Los Angeles Calif.
Calktite—Cement and compounds. U. S. Stoneware Co., New York, N. Y.
Calorex—Oil burners. W. N. Best Combustion Equipment Co., Inc., Carlstadt, N. J.
Camomatic—Valves. Belco Industrial Equipment Div., Inc., Paterson, N. J.
Capacilogs—Temperature recorders. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Capacitrols—Indicator - controllers. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Capillary—Air washers. Clarage Fan Co., Kalamazoo, Mich.
Capillary—Air washers, humidifiers, cooling towers, unit air conditioners. Air & Refrigeration Corp., New York, N. Y.
Capitol—Boilers, hanger or brackets, heaters, radiation. United States Radiator Corp., Detroit, Mich.
Carbolite—Soot destroyers. Ampion Corp., Long Island City, N. Y.
Careyduct—Ducts and duct fittings, insulation, non-metallic sheets, duct turning vanes. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Cash-Acme—Heating systems, pipe strainers, regulators, valves. Cash Valve Mfg. Corp., A. W., Decatur, Ill.
Castalu—Fans, wheels. Advance Aluminum Castings Corp., Chicago, Ill.
Cast-Refract—Refractories. Quigley Co., Inc., New York, N. Y.
Catch-All—Dehydrators. Sporlan Valve Co., St. Louis, Mo.
Cat's Eye—Observation ports. Ess Instrument Co., Bergenfield, N. J.
Caulking—Cement and compounds. Nebel Mfg. Co., Cleveland, O.
Causul—Valves. Lunkenheimer Co., Cincinnati, O.
Celeritas—Colorimeters. Daigger & Co., A., Chicago, Ill.
Cell-U-Blanket—Insulation. Masonite Corp., Chicago, Ill.
Cellufoam—Insulation. Masonite Corp., Chicago, Ill.
Celoron—Couplings. Continental-Diamond Fibre Co., Newark, Del.
Celo-Siding—Insulation. Celotex Corp., The, Chicago, Ill.
Cemcoat—Enamels and lacquers. Sonneborn Sons, Inc., New York, N. Y.
Cementseal—Enamels and lacquers. Acorn Refining Co., Cleveland, O.
Cemesto—Insulation. Celotex Corp., The, Chicago, Ill.
Central Aire—Unit air conditioners. Baker Refrigeration Corp., South Windham, Me.
Central—Conduit. Spang-Chalfant, Div. of National Supply Co., Pittsburgh, Pa.
CenTraVac—Compressors. Trane Co., The, La Crosse, Wis.
Centrimax—Meters. Leeds & Northrup Co., Philadelphia, Pa.
Centripac—Packing. Johns-Manville, New York, N. Y.
Centripeller—Roof ventilators. Jordan & Co., Paul R., Indianapolis, Ind.
Centrispray—Air Washers. Bahnson Co., Winston-Salem, N. C.
Certified Climate—Air conditioning units. Parks-Cramer Co., Fitchburg, Mass.
Cesco—Fittings. Columbia Engineering Service Co., San Francisco, Calif.
Chaco—Boiler and radiator sealing compounds. Desolvo Co., The, Pittsburgh, Pa.
Challenger—Propeller fans. Signal Electric Mfg. Co., Menominee, Mich.
Champion—Furnaces, heaters. National Heater Co., St. Paul, Minn.
Champion—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Champion—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.
Chan-L-Mounts—Bases and pads. Lord Mfg. Co., Erie, Pa.
Charg-A-Can—Refrigerants. Eston Chemicals, Div. American Potash & Chemical Corp., Los Angeles, Calif.
Chemiseal—Gaskets, joints, packing. United States Gasket Co., Camden, N. J.
Chem-o-Feeder—Feeders, pumps, water treatment. % Proportioneers, Inc., % Providence, R. I.
Chenco—Compounds, water treatment. Chemical Engineering Co., Dallas, Tex.
Chevron—Packing. Garlock Packing Co., Palmyra, N. Y.
Chicago—Brakes. Dreis & Krump Mfg. Co., Chicago, Ill.
Chicago—Stokers. Eddy Stoker Corp., Chicago, Ill.
Chicago-Wrigley—Bolts. Chicago Expansion Bolt Co., Chicago, Ill.
Chico Brikset—Cement. Chicago Fire Brick Co., Chicago, Ill.
Chieftain—Compressors. Tecumseh Products Co., Tecumseh, Mich.
Chief Thred-O-Matic—Pipe cutting machines. Gaines-Collins, Quijada Tool Division, Los Angeles, Calif.
Chill Air—Air conditioning units, fans. National Engineering & Mfg. Co., Kansas City, Mo.
Chill Vactor—Chillers and steam jet compressors. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Chimney Sweep—Chemical destroyers. Coughlan Co., G. N., West Orange, N. J.
Chinook—Ferrous heating surface. Bayley Blower Co., Milwaukee, Wis.
Chinookfin—Ferrous heating surface. Bayley Blower Co., Milwaukee, Wis.
Chlorimet—Heat exchangers, fans, fittings, heaters, pipe, pumps, sheets, valves. Duriron Co., Inc., The, Dayton, O.
Chlor-O-Mite—Pumps. % Proportioneers, Inc., % Providence, R. I.
Chore Boy—Burners. Standard Fuel Engineering Co., Detroit, Mich.
Chromalox—Preheaters, indicators-controllers, heating systems, superheaters, thermostats, unit heaters. Wiegand Co., Edwin L., Pittsburgh, Pa.
Chrome Lock—Gaskets. Products Research Co., Los Angeles, Calif.
Chromend—Electrodes. Arcos Corp., Philadelphia, Pa.
Chromix—Refractories. Quigley Co., Inc., New York, N. Y.
Chronoflo—Flow meters, recorders. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Chronometer—Valves. Defender Instrument & Regulator Co., St. Louis, Mo.
Chronotherm—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis.
Cinch—Expansion bolts. National Lead Co., New York, N. Y.
Circle-Air—Unit heaters. Paley Mfg. Corp., Brooklyn, N. Y.
Circle 1—Switches. Trumbull Dept., General Electric Co., Plainville, Conn.
Circo—Louvers and shutters, fan housings. Circulators & Devices Mfg. Co., Brooklyn, N. Y.
Clair-Tex—Connections. St. Clair Rubber Co., Detroit, Mich.
Clamp-A-Leak—Pipe repair clamps. Chelsea Metal Stamping Co., New York, N. Y.
Clarco—Unit heaters. Clarage Fan Co., Kalamazoo, Mich.
Classic—Registers. Auer Register Co., Cleveland, O.
Clean Right—Soot destroyers. General Filters, Inc., Detroit, Mich.
Clearview. Gages. Boston Machine Works Co., Lynn, Mass.
Clevite—Bearings. Cleveland Graphite Bronze Co., Cleveland, O.
Cliff—Boilers, water heaters. Terre Haute Boiler Works Co., Terre Haute, Ind.
Climate Changer—Unit air conditioners, unit air coolers. Trane Co., The, LaCrosse, Wis.
Climate-Lab—Test chambers. American Instrument Co., Inc., Silver Spring, Md.
Climatrol—Boilers, furnaces, heaters, fans, metallic ducts, air conditioning units. Mueller Furnace Co., L. J., Milwaukee, Wis.
Clime-Matic—Unit air conditioner. United Conditioning Corp., New York, N. Y.
Clime-matic Coey—Cooling towers. United Conditioning Corp., Croton Falls, N. Y.
Clipper—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Clipper—Seals. Johns-Manville, New York.
Clorodine—Boiler cleaning compounds. American Chemical Paint Co., Ambler, Pa.
Closin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Cocheo—Belting. Williams & Son, I. B., Dover, N. H.
Coeco—Controls and dampers. Combustion Equipment Co., Rock Island, Ill.
Coey—Towers. United Conditioning Corp., Croton Falls, N. Y.
Colalloy—Couplings, nipples, pipe. Colonial Alloys Co. Metals Div., Philadelphia, Pa.
Coldjet—Unit coolers, air conditioning units. Industrial Mfg. & Engineering Co., Chicago, Ill.
Coltemp—Insulation. Badham Insulation Co., Inc., Birmingham, Ala.
Columbia—Odor adsorbers, air conditioning units. Carbide and Carbon Chemicals Co., A Div. of Union Carbide and Carbon Corp., New York, N. Y.
Columbia—Ventilators. E. E. Souther Iron Co., St. Louis, Mo.
Combi-Matic—Burners. Siemon Mfg. Co., Kansas City, Mo.
Combustioneer—Stokers. Steel Products Engineering Co., Springfield, O.
Comet—Fans, unit heaters. New York Blower Co., Chicago, Ill.
Comfort Control—Temperature regulators. Bell & Gossett Co., Morton Grove, Ill.
Comfort Master—Barometric controls. A-P Controls Corp., Milwaukee, Wis.
Comfostat—Thermostats. Johnson Service Co., Milwaukee, Wis.
Co-Min-Co—Insulating cement. United States Mineral Wool Co., Stanhope, N. J.
Compact-Boilers. Titusville Iron Works Co., The, Titusville, Pa.
Compass—Belting. Goodyear Tire & Rubber Co., Akron, O.
Compound Lever—Hand shears and snips. Bartlett Mfg. Co., Detroit, Mich.
Conco—Boiler cleaning compounds, water treatment. Continental Products Co., Euclid, O.
Condor—Belting, V belts, pipe. Raybestos-Manhattan, Inc., Passaic, N. J.
Condo-Vac—Vacuum pumps. Chicago Pump Co., Chicago, Ill.
Coni-Vane—Ventilators. Allen Ventilator Div., Production Planning Co., Rochester, Mich.
Conomotors—Duct and valve operators. Conoflow Corp., Philadelphia, Pa.
Conseco—Water chillers, tube cleaners, coils, compressors, condensers, oil coolers, dryers,

heat exchangers, filters, headers, water heaters, joints, preheaters, pumps, separators, superheaters, tanks. Condenser Service & Engineering Co., Inc., Hoboken, N. J.
Consolidated—Valves. Manning, Maxwell & Moore, Inc., Stratford, Conn.
Constellation Line—Arc welders. Trindl Products, Ltd., Chicago, Ill.
Con-Tac-Tor—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Continental—Boilers. Boiler Engineering & Supply Co., Inc., Phoenixville, Pa.
Convector—Humidifiers. Maid-O'-Mist., Inc., Chicago, Ill.
Converto—Roof ventilators. Ammerman Co., C. L., Minneapolis, Min.
Conveyoflo—Conveyors. Builders-Providence, Inc., Providence, R. I.
Conveyor—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.
Coolair—Fans, louvers and shutters, ventilators, ventilator units. American Coolair Corp., Jacksonville, Fla.
Cool-A-Matic—Air conditioning units. Automatic Firing Corp., St. Louis, Mo.
Cooler-Aire—Window type cooling units. Artkraft Mfg. Co., Lima, O.
Coolero—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Coolite—Windows. Mississippi Glass Co., New York, N. Y.
Coolmaster—Unit coolers. Kramer Trenton Co., Trenton, N. J.
Cool Spot—Propeller fans. Signal Electric Mfg. Co., Menominee, Mich.
Copaltite—Cement and compounds, gaskets. National Engineering Products, Inc., Washington, D. C.
Cop-R-Loy—Sheets. Wheeling Steel Corp., Wheeling, W. Va.
Copr-fibre—Insulation. Forty-Eight Insulations, Inc., Aurora, Ill.
Copr-Tube—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Copyflex—Blueprint machine. Bruning Co., Inc., Charles, Chicago, Ill.
Coravol—Corrosion treatment. Western Chemical Co., Kansas City, Mo.
Cor-In Galvanode—Electrolytic devices. Rotometals, Inc., San Francisco, Calif.
Cornelius—Air compressors and regulators. North Penn Co., New York, N. Y.
Corogard—Protective Coatings. Minnesota Mining & Mfg. Co., St. Paul, Minn.
Corosex—Water treatment. Research Products Corp., Madison, Wis.
Corrodicide—Water treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Corrodine—Corrosion inhibition. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Corrosanti—Corrosion inhibition. Dr. Adolph Schror, East Orange, N. J.
Corufoil—Insulation. Reflectal Corp., New York, N. Y.
Cosmolubric—Refrigeration oil. Houghton & Co., E. F., Philadelphia, Pa.
Cotospray—Nozzles. J. F. Pritchard & Co., Kansas City, Mo.
Cotoid—Coatings. Lithgow Corp., Chicago, Ill.
Cottrell—Dust collectors. Research Corp., New York, N. Y.
Cottrell—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.
Cox—Water heaters. O'Brien Steam Specialty Co., Inc., Syracuse, N. Y.
Coxe—Stokers. Combustion Engineering-Superheater, Inc., New York, N. Y.
Co-Z-Air—Electric radiators. Conco Engineering Wks., Div. of H. D. Conkey & Co., Mendota, Ill.
Crescent—Boiler gage cocks, Wright-Austin Co., Detroit, Mich.
Crescent—Furnaces. Century Engineering Corp., Cedar Rapids, Ia.
Croloy—Pipe, tubes, and tubing. Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Cromaloy—Solder. Linde Air Products Co., The, Unit of Union Carbide & Carbon Corp., New York, N. Y.
Cross-Flo—Dehydrators. Remco, Inc., Zelienople, Pa.
Crown—Cement and compounds. Colebrook & Sons, Inc., W. H., Syracuse, N. Y.
Crystals—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Cushion-Cradled—Burners. Century Engineering Corp., Cedar Rapids, Ia.
Customair—Air conditioning units. Trane Co., The, La Crosse, Wis.
Custom Built—Unit air conditioners. Baker Refrigeration Corp., South Windham, Me.
Cut Master—Vertical turret lathes. Bullard Co., The, Bridgeport, Conn.
Cutno—Packing. Greene, Tweed & Co., North Wales, Pa.
Cycloidal—Air washers. Blower Application Co., Milwaukee, Wis.
Cycoil—Filters. American Air Filter Co., Louisville, Ky.
Cyclone—Exhaust heads. Wright Austin Co., Detroit, Mich.
Cyclops—Roller bearings. Roller Bearing Co. of America, Trenton, N. J.
DFN—Dehydrators, filters. McIntire Connector Co., Newark, N. J.
DFN Du-cal Drierite—Dehydrators, dehydrant and acid neutralizer. McIntire Connector Co., Newark, N. J.
DH—Ball bearings. Dodge Mfg. Corp., Mishawaka, Ind.
D.I.P.—Insulation, piping. Durant Insulated Pipe Co., Palo Alto, Calif.
D.I.P.—Insulation, piping. Durant International Corp., Williamstown, N. J.
D-O—Adsorbers. Research Products Corp., Madison, Wis.
D-O Kote—Adsorbers. Research Products Corp., Madison, Wis.
Daptobiu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Dart—Unions. Fairbanks Co., The, New York, N. Y.
Day-Nite Acratherm—Thermostats. Minneapolis Honeywell Regulator Co., Minneapolis, Minn.
Day-Steel—Pulleys. Dayton Rubber Co., Dayton, O.
Dean—Cleaners. Pierce Co., Wm. B., The, Buffalo, N. Y.
Debecote—Coatings. Debevoise Co., The, Brooklyn, N. Y.
Deflecto-Grilles—Grilles. United States Air Conditioning Corp., Minneapolis, Minn.
Deflectrol—Turning vanes. Barber-Colman Co., Rockford, Ill.
Defrostolator—Hot gas defrosting systems. Tenney Engineering, Inc., Newark, N. J.
Demandtrol—Valves. Sullivan Valve & Engineering Co., Butte, Mont.
Demon Air Set—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.
Densitron—Alarms. Ripley Co., Inc., Middletown, Conn.
Deoxidine—Cleaning compounds. American Chemical Paint Co., Ambler, Pa.
Dereka—Protective coatings. Debevoise Co., The, Brooklyn, N. Y.
Desert Air—Burners. Central States Mfg. Co., Inc., Arkansas City, Kan.
Desmond-Simplex—Pipe vises. Desmond-Stephan Mfg. Co., Urbana, O.
Desomatic—Dehumidifiers. Daly, Merritt & Sullivan, Inc., Falls Church, Va.
De-Sta-Co.—Fan housings, pipe clamps, valves. Detroit Stamping Co., Detroit, Mich.
Detect-A-Fire—Controls. Fenwal Inc., Ashland, Mass.
Detroit—Traps. Nason Co., Clarkston, Mich.
Detroit LoStoker—Stokers. Detroit Stoker Co., Detroit, Mich.
Detroit Rotograte Stoker—Stokers. Detroit Stoker Co., Detroit, Mich.
Detroit Rotostoker—Stokers. Detroit Stoker Co., Detroit, Mich.
Detroit Unistoker—Stokers. Detroit Stoker Co., Detroit, Mich.
Dexter—Valve reseaters, air separators, steam traps. Leavitt Machine Co., Orange, Mass.
Di-Acro—Benders, brakes, machines, shears. O'Neil Irwin Mfg. Co., Lake City, Minn.
Dial—Regulators. Parker-Kalon Corp., New York, N. Y.
Dial-A-Speed—Motors. Brown-Brockmeyer Co., Inc., Dayton, O.
Dialco—Pilot and signal lights. Dial Light Co. of America, Inc., Brooklyn, N. Y.
Dialon—Radiator valves, Bridgeport Brass Co., Bridgeport, Conn.
Diamond—Cement. Green Fire Brick Co., Mexico, Mo.
Diamond—Compounds, enamels and lacquers. Thompson & Co., Oakmont, Pa.
Diamond Fibre—Gaskets. Continental Diamond Fibre Co., Newark, Del.
Diamond H—Switches, thermostats, regulators, relays. Hart Mfg. Co., Hartford, Conn.
Diaphlex—Bellows, relays, solenoids, and switches. Cook Electric Co., Chicago, Ill.
Dia-Seal—Valves. Imperial Brass Mfg. Co., Chicago, Ill.
Dickbelt—Belting and drives. Dick Co., Inc., R. & J., Passaic, N. J.
Dickinson Ferrocast—Exhaust heads, ventilators. Dickinson, Aeolus, Chicago, Ill.
Dickrope—V belts and drives. Dick Co., Inc., R. & J., Passaic, N. J.
Dickvalve—Valves. Dick Co., Inc., R. & J., Passaic, N. J.
Diesel American—Oil burners. Diesel Oil Burner Corp. of New York, Jamaica, Long Island, N. Y.
Dieselite—Corrosion prevention. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Diffusaire—Diffusers. Hart & Cooley Mfg. Co., Holland, Mich.
Dilecto—Plastic pipe and tubing. Continental Diamond Fibre Co., Newark, Del.
Direct—Pipe fittings and flanges. Straight Line Foundry & Machine Corp., Direct Separator Div., The, Syracuse, N. Y.
Directrol—Vanes. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Discfin—Cooling surface. General Refrigeration Div., Yates-American Machine Co., Beloit, Wis.
Disc-Loc—Registers. Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Distributor—Radiation. Kehm Corp., The, Chicago, Ill.
Divco—Fittings, coils, pipe and tubing, sheets, solder, valves. Division Lead Co., Chicago, Ill.
Dix—Universal joints. Lovejoy Flexible Coupling Co., Chicago, Ill.
Dixigas—Gas welding rod. Atlantic Steel Co., Atlanta, Ga.
Dixisteel—Pipe hangers and supports, angles, flanges. Atlantic Steel Co., Atlanta, Ga.
Do-All—Combination hammer and drill. Wodack Electric Tool Corp., Chicago, Ill.
Do-Mor—Saw tools. Pioneer Tool Co., Racine, Wis.
Dominion—Gaskets, packing. Darcoid Co., Inc., New York, N. Y.
Dorex—Adsorbers. W. B. Connor Engineering Corp., Danbury, Conn.
Double Check—Boiler compounds. Hampton-Cross Co., The, Louisville, Ky.
Double Diamond—Hygrometers, recorders, psychrometers. H-B Instrument Co., Philadelphia, Pa.
Double-Flow—Cooling towers. Marley Co., Inc., The, Kansas City, Mo.
Double-Seal—Copper tube fittings. Hays Mfg. Co., Erie, Pa.
Doubleton—Pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Double U—Packing. Wayne Davies & Co., Westboro, Mass.
Dowmetal—Sheets, tubing, welding rod. Dow Chemical Co., Midland, Mich.
Downblast—Unit heaters. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Dowtherm—Process heating systems. Dow Chemical Co., The, Midland, Mich.
Draft-A-Justor—Draft controls. Preferred Utilities Mfg. Corp., New York, N. Y.
Draftender—Regulators. Penn Controls, Inc., Goshen, Ind.
Draft-O-Stat—Barometric controls. Hotstream Heater Co., Cleveland, O.
Draftstop—Ventilators. Nelson, Herman, Products, American Air Filter Co., Inc., Louisville, Ky.
Draftrite—Gages. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Draftrite—Gages. Cole-Sewell Engineering Co., St. Paul, Minn.
Drainator—Traps. Coe Mfg. Co., Painesville, O.
Drain-Dri—Sump pumps. Yeomans Bros. Co., Melrose Park, Ill.
Draintrol—Traps. Schaub Engineering Co., Fred H., Chicago, Ill.
Dresserell—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Dricooler—Heat exchangers. Marley Co., Inc., The, Kansas City, Mo.
Dri-Pipe—Insulation. Mystik Adhesive Products, Div. of Chicago Show Printing Co., Chicago, Ill.
Dripump—Pumps. Peerless of America, Inc., Chicago, Ill.
Drive-IT—Hangers and supports, welders. Powder Power Tool Corp., Portland, Ore.
Dri-vent—Radiator air valves. Frank D. Riggio Co., Rutherford, N. J.
Dry-Ex—Water chillers. Acme Industries, Inc., Jackson, Mich.
Dryfol—Building insulation. Reflectal Corp., New York, N. Y.
Dry-Ice—Refrigerants. Pure Carbonic, Inc., Div. of Air Reduction Co., Inc., New York.
Dry-paC—Insulation. Ric-Wil. Co., Cleveland.
Dry-Steam—Cleaning compounds. Utility Laboratory, Inc., Brooklyn, N. Y.
Dryvin—Expansion bolts. Star Expansion Bolt Co., New York, N. Y.
Dualarc—Arc Welders. Electric Arc, Inc., Newark, N. J.
Dual-Clone—Dust collectors. Day Co., The, Minneapolis, Minn.
Dual-Dial—Gages. Rochester Mfg. Co., Inc., Rochester, N. Y.
Dual-A-Fire—Burners. Automatic Firing Corp., St. Louis, Mo.
Dualene—Fuel oil treatment. Allen Co., Robert G., Mechanicsville, N. Y.
Dualsteel—Unions. Rockwood Sprinkler Co., Worcester, Mass.
Dualvent—Roof ventilators. Octagon Ventilator Co., Chicago, Ill.
Duboth—Boiler water treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Duclone—Dust collectors. Ducon Co., Mineola, N. Y.
Duco—Enamels and lacquers, du Pont de Nemours & Co., (Inc.), E. I., Fabrics & Finishes Dept., Wilmington, Del.
Ductatherm—Thermostats. Mercoid Corp., The, Chicago, Ill.
Ducturns—Vanes. Tuttle & Bailey, Inc., New Britain, Conn.
Ductype—Fans. South Bend Air Products, Inc., South Bend, Ind.
Dulux—Enamels and lacquers. du Pont de Nemours & Co., (Inc.) E. I., Fabrics & Finishes Dept., Wilmington, Del.
Dum Dum—Sealing compounds. Arco Co., The, Cleveland, O.
Duo Blo—Air heaters. American Furnace Co., St. Louis, Mo.
Duoflo—Pipe line strainers. Sheffler-Gross Co., Philadelphia, Pa.

Duonetic—Gas and oil burners. Webster Engineering Co., Tulsa, Okla.
Duo-Stat—Heating systems, thermostats. Johnson Service Co., Milwaukee, Wis.
Duotrol—Regulators, switches. Automatic Control Co., St. Paul, Minn.
Duplex—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Duplex—Pipe cutting machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
Durabel—Coatings. Perolin Co., Inc., Chicago, Ill.
Durabilt—Observation ports, conveyors. Chicago Fire Brick Co., Chicago, Ill.
DuraBilt—Registers. Auer Register Co., Cleveland, O.
Duradiant—Gas burners. Selas Corp. of America, Philadelphia, Pa.
Dura-Flex—Registers. Auer Register Co., Cleveland, O.
Duraflex—Stokers. Canton Stoker Corp., Canton, O.
Dura-Line—Registers. Auer Register Co., Cleveland, O.
DuraSpeed—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.
Duratex—Protective coatings. National Pipe Coatings, Inc., Huntington Park, Calif.
Durco—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.
Durcopump—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.
Durex—Bearings. Moraine Products Div., General Motors Corp., Dayton, O.
Durichlor—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.
Duridine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Durimet—Fans, fittings, pipe, valves. Duriron Co., Inc., Dayton, O.
Durobrace—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Dustav—Filters. Air-Maze Corp., Cleveland, O.
Dustex—Dust collectors. Dust Filter Co., Chicago, Ill.
Dust King—Dust collectors. Dust Filter Co., Chicago, Ill.
Dustkop—Dust collectors. Aget-Detroit Co., Ann Arbor, Mich.
Dust-Stop—Air Filters. Owens-Corning Fiberglas Corp., Toledo, O.
Dust-Trap—Filters. Morf Industries, Inc., Staten Island, N. Y.
Dustube—Dust collectors. American Wheelabrator & Equipment Corp., Mishawaka, Ind.
Dutch Boy—Solder, enamels and lacquers. National Lead Co., New York, N. Y.
Duxbak—Leather belting and packing. Schieren Co., Chas. A., New York, N. Y.
Dux-Sulation—Insulation. Grant Wilson, Inc., Chicago, Ill.
Dynaflow—Fans. South Bend Air Products, Inc., South Bend, Ind.
Dyna-Line—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.
Dynamaster—Recorders. Bristol Co., The, Waterbury, Conn.
Dyna-Speed—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.
Dynetic—Gas burners. Webster Engineering Co., Tulsa, Okla.
Dynetric—Balancing equipment. Gisholt Machine Co., Madison, Wis.

E.A.D.—Motors. Eastern Air Devices, Inc., Brooklyn, N. Y.
E-C—V belts. Goodyear Tire & Rubber Co., Akron, O.
E C & M—Motor controls, switches. Electric Controller & Mfg. Co., Cleveland, O.
EMD—Blowers. L. J. Wing Mfg Co., Linden, N. J.
E-Z—Registers, regulators. Acme Mfg. Co., Philadelphia, Pa.
E.Z.—Hangers or brackets, inserts, soot destroyers. Healey Ruff Co., St. Paul, Minn.
Eastern—Tanks. Case & Son Mfg. Co., W. A., Buffalo, N. Y.
Easy-Flo—Solder. Handy & Harman, New York, N. Y.
Ebko—Conduit, exchangers, pipe. Kaiser Co., E. B., Chicago, Ill.
Eclipse—Reciprocating compressors. Frick Co., Waynesboro, Pa.
Econofeed—Pumps, systems. Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Econ-O-Flow—Furnaces. U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
Econ-O-Matic—Motor bases. American Pulley Co., The, Philadelphia, Pa.
Economist—Boilers. Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Economite—Commercial and industrial gas burners. Mid-Continent Metal Products Co., Chicago, Ill.
Economizer—Nozzles. Bahnson Co., Winston-Salem, N. C.
Economy—Unit ventilators. Arex Co., Chicago, Ill.
Econostat—Heating systems. Barber-Colman Co., Rockford, Ill.
Econotherm—Boilers. Dutton Boiler Div., Hapman-Dutton Co., Kalamazoo, Mich.
Econovent—Ventilators. Western Engineering & Mfg. Co., Venice, Calif.
Eddy—Stokers. Eddy Stoker Corp., Chicago, Ill.
Edgeseal—Air filters. Wilson & Co., Inc., Chicago, Ill.
Edgetallic—Gaskets. Darcoid Co., Inc., New York, N. Y.
Effico—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
"88"—Pipe covering. Eagle-Picher Co., Cincinnati, O.
Elastic Metallic—Packing. Chesterton Co., A. W., Everett, Mass.
Elasto Rib—Vibration isolating bases. Korfund Co., Inc., Long Island City, N. Y.
Electranik—Indicator-controllers. Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Electric Filter Watchman—Gages. Herbusch Corp., The, St. Louis, Mo.
Electric Water Boy—Sump pumps. Weil Pump Co., Chicago, Ill.
Electrifugal—Centrifugal pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Electro-Airmat—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Cell—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electroflo—Valves. Hays Mfg. Co., Erie, Pa.
Electrofluid—Hydraulic speed changers. Link-Belt Co., Philadelphia, Pa.
Electro-Hot—Heaters. Red Spot Electric Co., Tacoma, Wash.
Electro-Klean—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Mist Collector—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Pl—Air cleaners. American Air Filter Co., Inc., Louisville, Ky.
Electro-Rod—Pipe cleaning machines. Spartan Tool Co., Chicago, Ill.
Electro-Sheet—Sheets. American Brass Co., Waterbury, Conn.
Electro-Shield—American Cladmetals Co., Carnegie, Pa.
Electroweld—Welders. Electric Arc., Inc., Newark, N. J.
Electro-Wind—Ventilators. Allen Ventilator Div., Production Planning Co., Rochester, Mich.
Electrunite—Stainless steel tubing and pipe, tubing benders. Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Elesco—Superheaters. Combustion Engineering-Superheater, Inc., New York, N. Y.
Elgex—Steam system treatment. Elgin Softener Corp., Elgin, Ill.
Elgin—Arc welders. Borm Mfg. Co., Elgin, Ill.
Elgin—Louvers and shutters. Elgo Shutter & Mfg. Co., Detroit, Mich.
Elm—Dampers. Elgo Shutter & Mfg. Co., Detroit, Mich.
Elsco—Blowers, compressors, pumps, valves. Electric Sprayit Co., The, Sheboygan, Wis.
Embee—Cement and compounds. Montgomery Bros., San Francisco, Calif.
Emco—Meters, regulators. Pittsburgh Equitable Meter Div., Rockwell Mfg. Co., Pittsburgh, Pa.
Emd-Com—Blowers. Wing Mfg. Co., L. J., Linden, N. J.
Emergency—Traps. Wright-Austin Co., Detroit, Mich.
Empire—Water meters. Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Enamel-Kote—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Enco—Burners, regulators, cooling units. Engineer Co., New York, N. Y.
Enduro—Sheets, tubing, pipe. Republic Steel Corp., Steel & Tubes Div., Cleveland, O.
Enduro—Unions. Jefferson Union Co., Inc., New York, N. Y.
Entrained Combustion—Gas burners. Mettler Co., Inc., The, Los Angeles, Calif.
Equatemp—Balancing valves. Ohio Brass Co., Mansfield, O.
Equiflo—Valves. Grinnell Co., Inc., Providence, R. I.
Eroduct—Insulation. Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Esco—Fittings, flanges, pipe. Electric Steel Foundry Co., Portland, Ore.
Ermeto—Fittings. Weatherhead Co., The, Cleveland, O.
Esna—Nuts. Elastic Stop Nut Corp. of America, Union, N. J.
Esso—Oil burners, heaters. Gilbert & Barker Mfg. Co., West Springfield, Mass.
Esso Bond—Cement, refractories. Ramtite Co., The, Chicago, Ill.
Eutec-Arc—Arc welders, welding and cutting apparatus. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
EuteCrod—Welding compounds, rods, solder. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Eutector—Welding compounds. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Eutecto-Mask—Compounds. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
EutecTorch—Torches, welding and cutting apparatus. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
EutecTrode—Welding electrodes. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Evactor—Pumps. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Evanaction—Valves. Taylor Instrument Companies, Rochester, N. Y.
Everbrite—Paint. Warren Refining & Chemical Co., The, Cleveland, O.
Everflex—Hose, coils, and tubing. Everhot Products Co., Chicago, Ill.
Everjet—Coatings. Barrett Div., Allied Chemical & Dye Corp., New York, N. Y.
Everlasting—Bolts and studs. H. M. Harper Co., Morton Grove, Ill.
Eversharp—Cutters. Everhot Products Co., Chicago, Ill.
Evertite—Clamps. Everhot Products Co., Chicago, Ill.
Evrtyte—Valves. Strong, Carlisle & Hammond Co., Cleveland, O.
Excel—Unions. Jefferson Union Co., Inc., New York, N. Y.
Excelsior—Pumps. Foster Pump Works, Inc., Brooklyn, N. Y.
Excelso—Water heaters. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Exhaustair—Fans. New York Blower Co., Chicago, Ill.
Exidust—Dust collectors. Lamson Corp., Blower Div., Syracuse, N. Y.
Expando—Tube expanders. Knuth Engineering Co., Chicago, Ill.
Extra Dry Esotoo—Liquid sulphur dioxide. Virginia Smelting Co., West Norfolk, Va.
Eye-Hye—Indicators. Reliance Gauge Column Co., Cleveland, O.
E-Z—Cutters. Gaines-Collins, Quijada Tool Division, Los Angeles, Calif.
Ez-arc—Arc welders. Will-Weld Mfg. Co., Inc., Omaha, Neb.
E-Z-On—Regulators. Gerrett Corp., M. A., Milwaukee, Wis.
E-Z See—Glasses. Remco, Inc., Zelienople, Pa.
Ezy-Kleen—Strainers. Blackmer Pump Co., Grand Rapids, Mich.

F & E—Stokers. Flynn & Emrich Co., Baltimore, Md.
FS—Bellows. Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Knoxville, Tenn.
F & T—Boilers. Farrar & Trefts, Buffalo, N. Y.
Fabrikated—Grilles, registers. Independent Register Co., Cleveland, O., New York, N. Y.
Faceweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Faessler—Tube expanders, tube flaring tools. Key Co., East St. Louis, Ill.
Fairco-Braze—Valves. Fairbanks Co., The, New York, N. Y.
Faircoseal—Valves. Fairbanks Co., The, New York, N. Y.
Fan-Air—Gas burners. Mettler Co., Inc., The, Los Angeles, Calif.
Fanmix—Burners. Coppus Engineering Corp., Worcester, Mass.
Fan-Pac—Fans. DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Far-Air—Air conditioning units, filters, humidifiers. Farr Co., Los Angeles, Calif.
Farragut—Packing. Darcoid Co., Inc., New York, N. Y.
Fast's—Couplings. Koppers Co., Inc., Pittsburgh, Pa.
Favorite—Ratchet wrenches. Greene. Tweed & Co., North Wales, Pa.
Featherfin—Heating and cooling surface, unit coolers. Wing Mfg. Co., L. J., Linden, N. J.
Featherweight—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Featherweight—Unit heaters. Wing Mfg. Co., L. J., Linden, N. J.
Feed-Rator—Chemical feeders. Fischer & Porter Co., Hatboro, Pa.
Fel-Pro—Gaskets, packing. Felt Products Mfg. Co., Chicago, Ill.
Felt Cote—Metal Sheets. American Steel Band Co., Pittsburgh, Pa.
Fenn's Rotary—Ventilators. Waverly Heating Supply Co., Boston, Mass.
Ferrenewo—Valves. Lunkenheimer Co., Cincinnati, O.
Ferrodex—Compounds. MacDermid Chemical Co., Bristol, Conn.
Ferro-Therm—Insulation. American Flange & Mfg. Co., New York, N. Y.
Ferroweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Fiberglas—Insulation. Owens-Corning Fiberglas Corp., Toledo, O.
Fiberlite—Insulation. Insulite Co., Minneapolis, Minn.
Fibron—Plastic tubing, plastic pipe. Irvington Varnish & Insulator Co., Irvington, N. J.

Filterpure—Cooling surface, unit coolers. Betz Corp., Hammond, Ind.
Fil-Thru—Gages. Applied Mechanics Co., Boston, Mass.
Filt-R-Ite—Himelblau Associates, Inc., Chicago, Ill.
Filt-R-Stil—Water treatment. American Cyanamid & Chemical Corp., New York, N. Y.
Filter Watchman—Air filter gages. Research Products Corp., Madison, Wis.
Findlay—Stokers. Central Rubber & Steel Corp., Findlay, O.
Fine-Screen—Strainers. Yarnall-Waring Co., Philadelphia, Pa.
Fin-Fans—Oil coolers. Fluor Corp., Ltd., The, Los Angeles, Calif.
Fin-Flex—Registers. Auer Register Co., Cleveland, O.
Finfold—Cooling surface. Pleasantaire Corp., Washington, D. C.
Finger Strap—Fasteners. Gerrard & Co., A. J., Melrose Park, Ill.
Finmaster—Radiation. Smith Co., Inc., H. B., The, Westfield, Mass.
Finnflex—Bases and pads, absorbers. Finn & Co., New York, N. Y.
Firecrete—Refractories. Johns-Manville, New York, N. Y.
Firefoil—Insulating panel. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.
Fire-Guard—Industrial stokers. Eddy Stoker Corp., Chicago, Ill.
Fire-Hearth—Refractories. Fireline Stove & Furnace Lining Co., Chicago, Ill.
Fireite—Furnace cement, refractories. Johns-Manville, New York, N. Y.
Fireset—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Fire Tender—Stokers. Holcombe & Hoke Mfg. Co., Inc., Indianapolis, Ind.
Fireye—Flame failure controls, systems. Combustion Control Corp., Cambridge, Mass.
Firma—Ventilators. Hirschman-Pohle Co., Inc., LeRoy, N. Y.
Firomatic—Filters, gages, links, switches, valves. Morse-Smith-Morse, Inc., Watertown, Mass.
Fitrite—Tools, roof ventilators. Levow, David, New York, N. Y.
Flame Buster—Spray nozzles. Grinnell Co., Inc., Providence, R. I.
Flame-otrol—Controls. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Flange-Jacks—Separators. Williams & Co., J. H., Buffalo, N. Y.
Flaremaster—Benders. Everhot Products Co., Chicago, Ill.
Flash-Off—Welding compounds. Acme White Lead & Color Wks., Detroit, Mich.
Flat-Belt—Pulleys and sheaves. The American Pulley Co., Philadelphia, Pa.
Flatjet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Fleetweld—Welding electrodes. Lincoln Electric Co., Cleveland, O.
Fleetwelder—Welders. Lincoln Electric Co., Cleveland, O.
Fleet-X—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Flex—Nipples. Techniflex Corp., Port Jervis, N. Y.
Flexarc—Arc welders. Westinghouse Electric Corp., Pittsburgh, Pa.
Flexaust—Hose. American Ventilating Hose Co., New York, N. Y.
Flexcell—Bases and pads. Celotex Corp., The, Chicago, Ill.
Flexfast—Hose clamps. Flexible Tubing Corp., Guilford, Conn.
Flexflyte—Duct fittings. Flexible Tubing Corp., Guilford, Conn.
Flexiblac—Protective coatings. Samuel Cabot, Inc., Boston, Mass.
Flexidur—Nozzles. Bahnson Co., Winston-Salem, N. C.
Flexiflo—Diffusers. Universal Diffuser Corp., New York, N. Y.
Flexfelt—Insulation. National Gypsum Co., Buffalo, N. Y.
Flex-i-liner—Rotary pumps. Vanton Pump Corp., New York, N. Y.
Flexloc—Lock nuts. Standard Pressed Steel Co., Jenkintown, Pa.
Flexodisc—Expansion joints. Croll-Reynolds Engineering Co., Inc., New York, N. Y.
Flexon—Bellows, pipe joints. Flexonics Corp., Maywood, Ill.
Flexpansion—Fittings and hose. Techniflex Corp., Port Jervis, N. Y.
Flexpin—Couplings. Smith & Serrell, Inc., Newark, N. J.
FlexRing—Couplings. Smith & Serrell, Inc., Newark, N. J.
Flexitite—Gate valves. Ohio Brass Co., Mansfield, O.
Flex-Tube—Analyzers, gages, manometers, switches, pilot tubes. Dwyer Mfg. Co., F. W., Chicago, Ill.
Flo—Dehydrant and acid neutralizer, for refrigerating systems. Allin Mfg. Co., Chicago, Ill.
Floatrol—Switches, regulators. Automatic Control Co., St. Paul, Minn.
Flocold—Unit coolers. Drayer-Hanson, Inc., Los Angeles, Calif.
Flo-Controls—Fittings. W-H Engineering Co., Chicago, Ill.
Floetless—Sump pumps. Imperial Brass Mfg. Co., Chicago, Ill.
Floguide—Flow meters. Fischer & Porter Co., Hatboro, Pa.
Flo-Klean—Filters, strainers. Cuno Engineering Corp., Meriden, Conn.
Flo-Master—Valves. General Heaters & Regulators Co., Chicago, Ill.
Flo-Matic—Conveyors, stokers. American Coal Burner Co., Chicago, Ill.
Florite—Air velocity meters. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Flo-Scope—Meters. Selas Corp. of America, Philadelphia, Pa.
Flotrol—Humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.
Flo-Tube—Conveyors. Canton Stoker Corp., Canton, O.
Flo-watch—Flow meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Flow-Cold—Water chillers. Acme Industries, Inc., Jackson, Mich.
Flowline—Pipe fittings. Welding Fittings Corp., New Castle, Pa.
Flowrator—Meters. Fischer & Porter Co., Hatboro, Pa.
Flow-Temp—Air conditioning Units. Acme Industries, Inc., Jackson, Mich.
Flualyzer—Analyzers. Engelhard, Inc., Chas., Newark, N. J.
Fluid Joists—Coils. Fricke, Fred J., Albuquerque, N. M.
Fluidyne—Pumps. Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Flush-Kleen—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Flux-Stik—Solder and fluxes. Lake Chemical Co., Chicago, Ill.
Foambuster—Compounds. Cannon Chemical Co., Inc., Cambridge, Mass.
Foamglas—Insulation. Armstrong Cork Co., Lancaster, Pa.
Foamglas—Insulation. Pittsburgh Corning Corp., Pittsburgh, Pa.
Foamglas—Insulation. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Force-Flo—Circulators, fittings, heaters, regulators, tanks. Kehm Corp., The, Chicago.
Force-Flo—Unit heaters. Trane Co., The, LaCrosse, Wis.
Form-A-Gasket—Cement and compounds. Permatex Co., Inc., Brooklyn, N. Y.
Form-A-Jig—Compounds. Eutectic Welding Alloys Corp., Flushing, New York, N. Y.
Formet—Water treatment. Perolin Co., Inc., Chicago, Ill.
Fosco—Water heaters. Schoedinger, F. O., Columbus, O.
4-Point—Control systems. Perfex Corp., Milwaukee, Wis.
"400" Series—Heaters. Fitzgibbons Boiler Co., Inc., New York, N. Y.
4-Star—Adhesive tape. Johns-Manville, New York, N. Y.
Fox—Regulators. Climax Metal Products Co., Cleveland, O.
Fracto-Crete—Refractories. Ramtite Co., The, Chicago, Ill.
Francke—Flexible couplings. Waldron Corp., John, New Brunswick, N. J.
Francke Parts—Couplings. Smith & Serrell, Inc., Newark, N. J.
Franzite—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Free-Aire—Air conditioning units, heaters. Kehm Corp., The, Chicago, Ill.
Free-Flow—Ventilators. Burt Mfg. Co., Akron, O.
Fre-Flo—Strainers. Fisher Governor, Marshalltown, Ia.
Freon—Refrigerants. E. I. du Pont de Nemours & Co., Inc., "Kinetic" Chemical Div., Wilmington, Del.
Fresh Air Maker—Propeller fans, units. Schwitzer-Cummins Co., Indianapolis, Ind.
Frevent—Valves. Bridgeport Brass Co., Bridgeport, Conn.
Frictionized—Belting. Baldwin Belting, Inc., New York, N. Y.
Frigid—Propeller fan blades and fans, dehumidifiers, welding fume exhausters, paint spray booths, air conditioning units. Circulators & Devices Mfg. Corp., Brooklyn, N. Y.
Frigistat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Frost-Tite—Fittings. Remco, Inc., Zelienople, Pa.
Fuelguard—Commercial and industrial burners. Fuelguard Co., Dallas, Tex.
Fuelguard—Regulators. Ashcraft Co., J. P., Dallas, Tex.
Fueltone—Fuel oil treatment. Ampion Corp., Long Island City, N. Y.
Fulflo—Filters. Commercial Filters Corp., Melrose, Mass.
Fulgrip—Pulleys and sheaves. Maurey Mfg. Corp., Chicago, Ill.
Fulljet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Fulscope—Recorders, recorder-controllers, regulators. Taylor Instrument Companies, Rochester, N. Y.
Fuseair—Air diffusers. Aladdin Heating Corp., Oakland, Calif.
Fusionweld—Tubing. Avon Tube Div., Highbe Mfg. Co., Rochester, Mich.
Fusomatic—Links. Preferred Utilities Mfg. Corp., New York, N. Y.
Fybr-Tech—Gaskets and sheets. Technical Ply Woods, Chicago, Ill.
Fyr-Feeder—Stokers. American Coal Burner Co., Chicago, Ill.
Fyrite—Analyzers, combustion testing kits. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Fyrite—Recorders. Cole-Sewell Engineering Co., St. Paul, Minn.
Fyritec—Recorders. Cole-Sewell Engineering Co., St. Paul, Minn.

GB—Fans. General Blower Co., Morton Grove, Ill.
G. B. C.—Gages, regulators. General Blower Co., Inc., Philadelphia, Pa.
G-E—Compressors, condensers, thermostats. General Electric Co., Air Conditioning Dept., Bloomfield, N. J.
G-Fin—Cooling and heating surface. Griscom-Russell Co., The, New York, N. Y.
GIL—Filters, regulators. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
GIL Governoret—Valves. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
GIL No-Hum—Check valves. Gas & Oil Industry Laboratories, Inc., Irvington, N. J.
G. P.—Smoke density recorders, analyzers, combustion control systems. General Power Plant Corp., Ossining, N. Y.
G-R—Aftercoolers, oil coolers, water chillers, regulators, exchangers. Griscom-Russell Co., The, New York, N. Y.
Gaco—Couplings. Gates Engineering Co., Wilmington, Del.
Gaco-Neoprene—Coatings, fittings, pipe. Gates Engineering Co., Wilmington, Del.
Gagetron—Regulators. Instruments, Inc., Tulsa, Okla.
Galbestos—Sheet metal. Robertson Co., H. H., Pittsburgh, Pa.
Galongage—Gages. Applied Mechanics Co., Boston, Mass.
Galv-O-Zinc—Coatings. Blue Ridge Talc Co., Inc., Henry, Va.
Gasgun—Torches. Century Aircraft, Los Angeles, Calif.
Gas-A-Fire—Burners. Automatic Firing Corp., St. Louis, Mo.
Gas-Pak—Welding rod. Marquette Mfg. Co., Minneapolis, Minn.
Gast—Filters, separators. Johnson Corp., The, Three Rivers, Mich.
Gasteam—Radiators. Clow & Sons, James B., Chicago, Ill.
Gasweld—Torches, regulators, welding rod and apparatus. Liquid Carbonic Corp., The, Chicago, Ill.
Geddes—Radiation. Fowler & Wolfe Radiator Co., Norristown, Pa.
Gehl—Stokers. Eddy Stoker Corp., Chicago, Ill.
Gemaco—Compressors. General Machinery Co., Spokane, Wash.
Gemco—Bolts, clamps, hangers and supports, fasteners. Goodloe E. Moore, Inc., Danville, Ill.
Gemware—Hygrometers, psychrometers, thermometers, switches. G. M. Mfg. Co., New York, N. Y.
Genetron—Refrigerants. General Chemicals Div., Allied Chemical & Dye Corp., New York, N. Y.
Genuine Stillson—Wrenches. Walworth Co., New York, N. Y.
Geometric—Chasers. Greenfield Tap & Die Corp., Greenfield, Mass.
Giant—Radiation. John J. Nesbitt, Inc., Philadelphia, Pa.
Giant—Radiator hangers. Western Hanger Co., San Francisco, Calif.
Gilbarco—Compressors, oil burners, heaters, Pumps. Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gilsonite—Protective coatings. Ohmlac Paint & Refining Co., Inc., New York, N. Y.
Gilt Edge—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.
Gland Pakt—Expansion joints. Yarnall-Waring Co., Philadelphia, Pa.
Glasweld—Fiber pipe. United States Plywood Corp., New York, N. Y.
Glo Tech—Glass pipe. Fischer & Porter Co., Hatboro, Pa.
Glowan—Gas burners. Martin Co., Inc., J. O., San Francisco, Calif.
Gloweld—Welded steel tubing. Globe Steel Tubes Co., Milwaukee, Wis.
Glucosates—Compounds, steam system treatment. Haering & Co., Inc., D. W., San Antonio, Tex.
Glycolator—Sterilizing units. Iron City Chemical Co., Valencia, Pa.
Glycolator—Sterilizing units. Pittsburgh Chemical Laboratories, Inc., Pittsburgh, Pa.
Glycosol—Sterilizing units. Pittsburgh Chemical Laboratories, Inc., Pittsburgh, Pa.
Glycosol—Sterilizing units. Iron City Chemi-

cal Co., Valencia, Pa.

Gohi—Sheets. Newport Rolling Mill Co., Newport, Ky.

Gold Bond—Insulation. National Gypsum Co., Buffalo, N. Y.

Goodyearite—Packing. Goodyear Tire & Rubber Co., Akron, O.

Gordon—Pipe and tubing benders. Pacific Machine & Iron Wks., Tacoma, Wash.

Grad-U-Motor—Damper operators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Gradustat—Regulators, thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Gradutrol—Diaphagm valves, radiator orifices. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Grand Rapids—Boiler vacuum cleaners. Doyle Vacuum Cleaner Co., Grand Rapids, Mich.

Granodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.

Granodraw—Protective coatings. American Chemical Paint Co., Ambler, Pa.

Graycote—Cement and compounds. Chicago Gasket Co., Chicago, Ill.

Graylite—Insulation. Insulite Co., Minneapolis, Minn.

Greastop—Air filters. Air-Maze Corp., Cleveland, O.

Greenspot—Hose clamps. Scovill Mfg. Co., Waterville Div., Waterville, Conn.

Grid—Unit coolers, radiation, unit heaters. Murray Mfg. Co., D. J., Wausau, Wis.

Gripzins—Expansion bolts. Star Expansion Bolt Co., New York, N. Y.

Gritseald—Rotary pumps. St. Louis Tool Co., St. Louis, Mo.

Gruvagrip—Couplings. Gustin-Bacon Mfg. Co., Kansas City, Mo.

Guardian—Gaskets. Garlock Packing Co., Palmyra, N. Y.

Gunchrome—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

Gundol—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.

Gunmix—Refractories. Basic Refractories, Inc., Cleveland, O.

Gun Pakt—Expansion joints. Yarnall-Waring Co., Philadelphia, Pa.

Guthfan—Fans. Guth Co., Edwin F., St. Louis, Mo.

Gyrol Fluid Drive—Speed changer. American Blower Corp., Detroit, Mich.

H & C—Grilles, registers. Hart & Cooley Mfg. Co., Holland, Mich.

H-O-H—Compounds, feeders, steam system and water treatment. Haering & Co., Inc., D. W., San Antonio, Tex.

HS—Fans. American Blower Corp., Detroit, Mich.

Hallowell—Bearings. Standard Pressed Steel Co., Jenkintown, Pa.

Hammerkraft—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.

Hammerlin—Coatings, enamels. Interchemical Corp., Newark, N. J.

Hammermill—Belting. Goodyear Tire & Rubber Co., Akron, O.

Hammer-on—Regulators. Air Control Products, Inc., Coopersville, Mich.

Hammer-Set—Bolts. Rawlplug Co., Inc., The, New York, N. Y.

Hancock—Valves. Manning, Maxwell & Moore, Inc., Stratford, Conn.

Handy—Benders. Holsclaw Bros., Inc., Evansville, Ind.

Handy—Ducts and duct fittings. Meyer & Bro. Co., F., Peoria, Ill.

Handy Andy—Vise stands. Western Wire Products Co., St. Louis, Mo.

Handy-Flux—Solder. Handy & Harman, New York, N. Y.

Hardweld—Electrodes. Lincoln Electric Co., Cleveland, O.

Hartmann—Heaters. Montgomery Bros., San Francisco, Calif.

Hazleton—Pumps, strainers, valves. Barrett, Haentjens & Co., Hazleton, Pa.

Heacon—Dampers. Thermix Corp., The, Greenwich, Conn.

Heath-Crete—Refractories. Quigley Co., Inc., New York, N. Y.

Heart-Oak—Belting. Graton & Knight Co., Worcester, Mass.

Heat-aid—Refractories. Pyrolite Products Co., Cleveland, O.

Heatcote—High temperature paint. Debevoise Co., The, Brooklyn, N. Y.

Heat Extractor—Boilers. National Radiator Co., The, Johnstown, Pa.

Heatomat—Boilers. Richmond Radiator Co., New York, N. Y.

Heat-O-Meter—Temperature regulators, thermostats. Miller-Harris Instrument Co., Milwaukee, Wis.

Heat-Pak—Boilers, heaters. Aldrich Co., The, Wyoming, Ill.

Heatrim—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.

Heat-Rite—Registers. Auer Register Co., Cleveland, O.

Heatsaver—Systems. Advance Pump Co., Berkeley, Calif.

Heatsum—Conductors. Roberson Co., L. N., Seattle, Wash.

Heat-Tite—Insulating cement. Ramtite Co., The, Chicago, Ill.

Heat-Valve—Ventilators. Swartwout Co., The, Cleveland, O.

Heat-X—Heat exchangers, aftercoolers, chillers, coolers, heaters, condensers. Heat-X-Changer Co., Inc., The, Brewster, N. Y.

Heat-X-Fin—Finned surface and tubing. Heat-X-Changer Co., Inc., The, Brewster, N. Y.

Heilex—Tanks. Heil Process Equipment Corp., Cleveland, O.

Heliarc—Welders. Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.

Helical—Tubing. Rome-Turney Radiator Co., Rome, N. Y.

Heliflow—Aftercoolers, chillers, oil coolers, heat exchangers, water heaters. Graham Mfg. Co., Inc., New York, N. Y.

Hellite—Refractories. Johns-Manville, New York, N. Y.

Herco—Arc welders. Hercules Electric & Mfg. Co., Inc., Brooklyn, N. Y.

Herculoy—Tubing. Revere Copper and Brass, Inc., New York, N. Y.

Herecrol—Protective Coatings. Heresite & Chemical Co., Manitowoc, Wis.

Hev-E-Oil—Burners. Cleaver-Brooks Co., Milwaukee, Wis.

Hex-Changer—Heat Exchangers. Drayer-Hanson, Inc., Los Angeles, Calif.

Hex-Tex—Belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

Hi-Cap—Furnaces. Syncromatic Corp., Watertown, Wis.

Hi-Duty—Tubing cutters, flaring tools, Imperial Brass Mfg. Co., Chicago, Ill.

Hi-Duty—Combustion chambers. Monogram Products Co., Inc., Philadelphia, Pa.

Hi-Ef—Filters, heads, separators. Anderson Co., V. D., The, Cleveland, O.

Hi-Fin—Surfaces, tubing. Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.

Highflex—Belting. Goodrich Co., B. F., Akron, O.

High-Ten-500—Solder. Industrial Service Laboratories, Milwaukee, Wis.

High Test—Water heaters. Burnam Corp., Boiler Div., Irvington, N. Y.

Hi-Heat—High temperature paint. Claronex Products, Inc., Brooklyn, N. Y.

Hilger—Chillers, refrigerating compressors, unit coolers, unit air conditioners, valves. XL Refrigerating Co., Inc., Chicago, Ill.

Hi-Lift—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.

Hi-Lo—Alarms. Yarnall-Waring Co., Philadelphia, Pa.

Hi-Lo—Pumps. Yeomans Bros. Co., Melrose Park, Ill.

Hi-Lo-Graph—Recorders. Yarnall-Waring Co., Philadelphia, Pa.

Hi-Peak—Water chillers. Acme Industries, Inc., Jackson, Mich.

Hi-Seal—Cement and compounds. Greene, Tweed & Co., North Wales, Pa.

Hi-Speed—Welding and cutting apparatus. Dockson Corp., Detroit, Mich.

Hitchings—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.

Hi-Temp—Insulation. Carey Mfg. Co., Philip, Lockland, Cincinnati, O.

Hi-Temp—Insulation cement. Zonolite Co., Chicago, Ill.

Hi-Test—Boilers. Kewanee-Ross Corp., Kewanee, Ill.

Hi-Value—Adhesive tape. Johns-Manville, New York, N. Y.

Hoffman—Draft controls. Salina Metal Products Co., Salina, Kan.

Holdtite—Solder. American Brass Co., Waterbury, Conn.

Holgun—Drills. Black & Decker Mfg. Co., Towson, Md.

Hollo-Tech—Doors and panels. Technical Ply-Woods, Chicago, Ill.

Holt—Strainers, tube cleaners. Rosedale Foundry & Machine Co., Pittsburgh, Pa.

Holtite—Bolts, screws. Continental Screw Co., New Bedford, Mass.

Holtite—Clamps. Yarnall-Waring Co., Philadelphia, Pa.

Honeycomb—Filters. Wilson & Co., Inc., Chicago, Ill.

Horton—Tanks. Chicago Bridge & Iron Co., Chicago, Ill.

Hot Boy—Unit heaters. Corcaire Heater Corp., The, Cleveland, O.

Hot Shot—Unit coolers. Drayer-Hanson, Inc., Los Angeles, Calif.

Hot Shot—Pumps. Yeomans Bros. Co., Melrose Park, Ill.

Hot Spot—Preheaters. Rempe Co., Chicago, Ill.

Hot Spot—Spot welders. Acme Electric Welder Co., Los Angeles, Calif.

Houghto-Clean—Boiler cleaning compounds. Houghton & Co., E. F., Philadelphia, Pa.

Hovalco—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.

Huber—Stokers. Flynn & Emrich Co., Baltimore, Md.

Humiclean—Cleaning compounds, water treatment. Carolina Aniline & Extract Co., Charlotte, N. C.

Humidair—Humidifiers. Skilbeck Mfg. Co., Kenosha, Wis.

Humidigraph—Humidity recorders. Bristol Co., Waterbury, Conn.

Humidiguide—Hygrometers. Taylor Instrument Companies, Rochester, N. Y.

Humidomist—Nozzles, humidifiers. Supreme Electric Products Corp., Rochester, N. Y.

Humidostat—Humidistats. Johnson Service Co., Milwaukee, Wis.

Humiduct—Unit air conditioners. Bahnson Co., Winston-Salem, N. C.

Humid-U-Stat—Humidistats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Humi-Temps—Unit air coolers. Larkin Coils, Atlanta, Ga.

Hum-O-Zone—Room type humidifiers. Daffin Mfg. Co., Lancaster, Pa.

Humphrey—Heaters. General Gas Light Co., Kalamazoo, Mich.

Hurricane—Heaters. Zink Co., John, Tulsa, Okla.

Hydralt—Protective coatings. Flintkote Co., The, New York, N. Y.

Hydramotor—Valves. General Controls Co., Glendale, Calif.

Hydro—Recorders. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

Hydro-Clone—Dust collectors, welding fume exhausters. Whiting Corp., Harvey, Ill.

Hydro-Flo—Heaters, heating systems, circulators, regulators. Bell & Gossett Co., Morton Grove, Ill.

Hydro-Foam—Dust collectors. Mahon Co., R. C., Detroit, Mich.

Hydro-Foil—Pumps. Peerless Pump Div., Food Machinery & Chemical Corp., Los Angeles, Calif.

Hydroline—Shaft seals. Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.

Hydro-Matic—Connectors. Mechanical Products Corp., Chicago, Ill.

Hydron—Bellows. Clifford Mfg. Co., Div. of Standard-Thomson Corp., Waltham, Mass.

Hydro-Temp—Cooling towers. Acme Equipment Co., Muskogee, Okla.

Hydro Therm—Heaters, heating systems. Hook & Ackerman, Inc., New York, N. Y.

Hydro-Vari—Hydraulic coupling changers. Twin Disc Clutch Co., Rockford, Ill.

Hydro-Whirl—Dust collectors, spray booths. Peters-Dalton, Inc., Detroit, Mich.

Hydryer—Dehumidifiers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.

Hy-Duty—Blower wheels, fans. Schwitzer-Cummins Co., Indianapolis, Ind.

Hy-Pro—Taps. Continental Screw Co., New Bedford, Mass.

Hyrate—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.

Hy-Spar—High temperature paint. Midland Paint & Varnish Co., Cleveland, O.

Hy-Speed—Pipe vises. Munton Mfg. Co., Franklin Park, Ill.

Hytemp—Insulation. Armstrong Cork Co., Lancaster, Pa.

Hy-Temp—Cement, insulation. Keasbey & Mattison Co., Ambler, Pa.

Hytempite—Cement, refractories. Quigley Co., Inc., New York, N. Y.

Hy-Test—Water heaters. Smith Co., Inc., H. B., The, Westfield, Mass.

Hytork—Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.

IMO—Pumps. De Laval Steam Turbine Co., Trenton, N. J.

I-R—Ingersoll-Rand, New York, N. Y.

IVCO—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

Ice-Cel—Refrigeration accumulators. Dole Refrigerating Co., Chicago, Ill.

Icy-Flo—Accumulators. McQuay, Inc., Minneapolis, Minn.

Ideal—Blowers. Perfection Grate & Stoker Co., Springfield, Mass.

Ideal—Speed changers, pulleys and sheaves. Lovejoy Flexible Coupling Co., Chicago, Ill.

Ideal—Traps. Nason Co., Clarkston, Mich.

Immersatherm—Thermostats. Mercoid Corp., The, Chicago, Ill.

Impact—Nozzles. Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.

Imperial—Air conditioning units. International Metal Products Co., Phoenix, Ariz.

Impregnated—Bases and pads. Celotex Corp., The, Chicago, Ill.

Impulse—Traps. Yarnall-Waring Co., Philadelphia, Pa.

Inco—Electrodes, flanges, pipe fittings, pipe, rod, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.

Inconel—Pipe, fittings, flanges, pipe, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.

Inconel—Tubing. Trent Tube Co., East Troy, Wis.

Indeeco—Heaters, pipe heating systems. In-

dustrial Engineering & Equipment Co., St. Louis, Mo.
Indoor-Outdoor—Thermostats. White-Rodgers Electric Co., St. Louis, Mo.
IngAclad—Stainless clad sheets. Ingersoll Steel Div., Borg-Warner Corp., Chicago, Ill.
In-Hib-Co—Protective coatings. Haering & Co., Inc., D. W., San Antonio, Tex.
Inkstop—Air filters. Air-Maze Corp., Cleveland, O.
Inseal—Piston rings. Double Seal Ring Co., Fort Worth, Tex.
Ins-lite—Insulation. Insulite Co., Minneapolis, Minn.
Instant—Heaters, preheaters. Johnson Corp., The, Three Rivers, Mich.
Instant Glo—Combustion chambers. Boston Machine Works Co., Lynn, Mass.
Instant-Hardner—Compounds. Eutectic Welding Alloys Corp., Flushing, N. Y., N. Y.
InstOmatic—Couplings. Wiggins Oil Tool Co., Inc., E. B., Los Angeles, Calif.
Insulag—Insulation. Quigley Co., Inc., New York, N. Y.
Insulbrix—Refractories. Quigley Co., Inc., New York, N. Y.
Insulfil—Insulation. Refractory & Insulation Corp., New York, N. Y.
Insulwool—Insulation. General Insulating Products Co., Brooklyn, N. Y.
Insutape—Pipe insulation. Union Asbestos & Rubber Co., Chicago, Ill.
Insutube—Insulation. Union Asbestos & Rubber Co., Chicago, Ill.
Integral Jet—Burners. Stout & Sons, David, St. Louis, Mo.
Intensarc—Electrodes. National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.
Inter-Matic—Time switches. International Register Co., Chicago, Ill.
International—Liquid level gages. Applied Mechanics Co., Boston, Mass.
Involute—Spray nozzles. Yarnall-Waring Co., Philadelphia, Pa.
Ionaire—Ionization apparatus. General Ozone Corp., Chicago, Ill.
Ironset—Furnace cement. Fireline Stove & Furnace Lining Co., Chicago, Ill.
Ironweld—Compounds. Sight Feed Generator Co., West Alexandria, O.
Irv-o-lite—Plastic tubing. Irvington Varnish and Insulator Co., Irvington, N. J.
Isolant—Vibration absorbers. Finn & Co., Inc., T. R., New York, N. Y.
Isomodes—Bases and pads, vibration isolating. M. B. Mfg. Co., The, New Haven, Conn.

J & C—Burners, fans, furnaces, heaters. Jackson & Church Co., Saginaw, Mich.
J F S—Speed changers. Stephens-Adamson Mfg. Co., Aurora, Ill.
J-M—Gaskets, bases and pads, cement, tape. Johns-Manville, New York, N. Y.
J-M Ball—Floats, traps. Cryer Trap & Valve Co., Inc., New York, N. Y.
J O Line—Wrenches, valves. J O Mfg. Co., South Gate, Calif.
J-W—Combustible gas alarms. Johnson & Williams Ltd., Palo Alto, Calif.
Jacobus—Valves. Majot Automatic Machine Co., Inc., East Orange, N. J.
Janitrol—Boilers, burners, heaters, systems. Surface Combustion Corp., Toledo, O.
Jarco—Unions, valves. Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Ject-O-Valve—Ventilators. Swartwout Co., Cleveland, O.
Jennings—Pumps, ejectors. Nash Engineering Co., South Norwalk, Conn.
Jetal—Protective coatings. Alrose Chemical Co., Providence, R. I.
Jetcote—Protective coatings. Watson-Standard Co., Pittsburgh, Pa.
Jiffy Clips—Hangers and supports. Minerallac Electric Co., Chicago, Ill.
Jiffy—Regulators. Parker-Kalon Corp., New York, N. Y.
Joaz—Stainless steel fittings. J O Mfg. Co., South Gate, Calif.
John Crane—Boiler tube expanders, seals, packing. Crane Packing Co., Chicago, Ill.
Jointite—Insulation. Mundet Cork Corp., North Bergen, N. J.
Jorgensen—Pipe clamps. Adjustable Clamp Co., Chicago, Ill.
Junior—Radiation. Weil-McLain Co., Michigan City, Ind.
JusRite—Ducts and duct fittings, pipe and fittings. Corbman Bros., Inc., Philadelphia, Pa.

K—Fittings. Kuhns Brothers Co., Dayton, O.
K. A. T.—Compounds and water treatment. American K.A.T. Corp., Garwood, N. J.
K-B—Dampers, regulators. Kerentoff, G. L., Cincinnati, O.
K-Fin—Cooling and heating surface. Griscom-Russell Co., The, New York, N. Y.
K and M—Controls, strainers, traps, valves. Kieley & Mueller, Inc., North Bergen, N. J.
K-Master—Filters, separators, traps, valves. Kaye & MacDonald, Inc., West Orange, N. J.
K-Shield—Boiler and pipe insulation. Robinson Industries, Coleman, Mich.
Kable Kord—Belting. New York Belting & Packing Co., Passaic, N. J.
Kane—Boilers. Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Bridgeport, Pa.
Kapco—Cement, sheets and board. Keystone Asphalt Products Co., Chicago, Ill.
Karbate—Carbon pipe, heat exchangers, pumps. National Carbon Co., Div. of Union Carbide & Carbon Corp., New York, N. Y.
Kasson—Motors. General Die and Stamping Co., New York, N. Y.
Kathabar—Dehumidifiers, unit air conditioners, humidifiers, air washers. Surface Combustion Corp., Toledo, O.
Kek—Compounds, steam and water treatments. Kenite Laboratory, Inc., Madison, N. J.
Keldur—Bases and pads. Hobsite Products Co., Harrison, N. J.
Kemtex—Water softener. MacDermid Chemical Co., Bristol, Conn.
Ken—Combustion chambers. Barclay, Inc., Robert, Chicago, Ill.
Kenbric—Soot destroyers. Kenite Laboratory, Inc., Madison, N. J.
Kentucky—Sheets. Newport Rolling Mill Co., Newport, Ky.
KeyKast—Pipe fittings & flanges. Key Co., East St. Louis, Ill.
Keystone—Packaged steam boiler units. Erie City Iron Wks., Erie, Pa.
Keystone—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Key-Tite—Cement and compounds. Key Co., East St. Louis, Ill.
Kidskin—Packing. Darcoid Co., Inc., New York, N. Y.
Kil-Mos—Water treatment. Chemical Engineering Co., Dallas, Tex.
Kimsul—Insulation. Kimberly-Clark Corp., Neenah, Wis.
Kinetic—Gas burners. Webster Engineering Co., Tulsa, Okla.
King-clip—Valves. Lunkenheimer Co., Cincinnati, O.
Kleen Air—Filters. Kaye & MacDonald, Inc., West Orange, N. J.
Kleenflo—Unit air filters. Air-Maze Corp., Cleveland, O.
Kleen Tube—Heaters. Vapor Heating Corp., Chicago, Ill.
Klero—Packing. Greene, Tweed & Co., North Wales, Pa.
Klingtite—Belting. Goodyear Tire & Rubber Co., Akron, O.
Klixon—Temperature control valves, motor controllers. Spencer Thermostat Div., Metals & Controls Corp., Attleboro, Mass.
Klondike—Arc welders. Fern, Ralph, Scranton, Pa.
Klosd—Motors. Sterling Electric Motors, Inc., Los Angeles, Calif.
Knight-Ware—Pipe, prefabricated ducts, valves, ventilators. Knight, Maurice A., Akron, O.
Knock-Out—Arc welders, torches, drills. Lee Co., K. O., Aberdeen, S. D.
Kno-Draft—Air diffusers. Connor Engineering Corp., W. B., New York, N. Y.
Kold Board—Insulation. Baldwin-Hill Co., Trenton, N. J.
Kontrol Master—Air valves. Kieley & Mueller, Inc., North Bergen, N. J.
Kontrol Motor—Diaphragm valves. Kieley & Mueller, Inc., North Bergen, N. J.
Kooler-aire—Commercial air conditioners. United States Air Conditioning Corp., Minneapolis, Minn.
Kool Master—Propeller fans. Air Equipment Co., Chicago, Ill.
Kool-Shade—Solar heat resisting screens. Ingersoll Products Div., Borg-Warner Corp., Chicago, Ill.
Korda—Gaskets. Chicago Gasket Co., Chicago, Ill.
Korda-Seal—Packing. Chicago Gasket Co., Chicago, Ill.
Korector—Draft controls. Cole-Sewell Engineering Co., St. Paul, Minn.
Korolac—Protective coatings. Goodrich Co., B. F., Akron, O.
Koroseal—Plastic tubing, protective coatings. Goodrich Co., B. F., Akron, O.
Kromatrol—Colorimeters. Will Corp., Rochester, N. Y.
Krome Kote—Coatings. Wolfe-Kote Co., Inc., Sheboygan, Wis.
Kromik—Coatings. Sherwin-Williams Co., The, Cleveland, O.
Kromover—Compounds. All-State Welding Alloys Co., Inc., White Plains, N. Y.
Kuiene 131—Refrigerants. Eston Chemicals, Div. American Potash & Chemical Corp., Los Angeles, Calif.
Kwikflux-Solder. Special Chemicals Corp., New York, N. Y.
Kwik-way—Regulators. Hart & Cooley Mfg. Co., Holland, Mich.
Kwik-Steam—Boilers. Littleford Bros., Inc., Cincinnati, O.
Kyram—Refractories and refractory cement. Quigley Co., Inc., New York, N. Y.
L. A.—Motors. The Louis Allis Co., Milwaukee, Wis.
L-R—Couplings. Lovejoy Flexible Couplings Co., Chicago, Ill.
La-Co—Solder and fluxes. Lake Chemical Co., Chicago, Ill.
Lagfas—Adhesives. Foster Co., Benjamin, Philadelphia, Pa.
Lamneck—Ducts and duct fittings. Clayton & Lambert Mfg. Co., Louisville, Ky.
LaMont—High temperature heating systems. The International Boiler Works Co., East Stroudsburg, Pa.
Lawson—Wrenches. Fairmount Tool & Forging, Cleveland, O.
L-Blow—Fans, ventilators. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Leader—Stocks and dies. Oster Mfg. Co., Cleveland, O.
Leader—Unit air conditioning. Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Leaflex—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Leak Lock—Cement and compounds. Highside Chemicals Co., Clifton, N. J.
Lectro-Clad—Protective coatings, fittings, Pipe. Bart Mfg. Co., Inc., Belleville, N. J.
Lectrodryer—Dehumidifiers. Pittsburgh Lectrodryer Corp., Pittsburgh, Pa.
Led-Plate—Cement and compounds. Armite Laboratories, Los Angeles, Calif.
Ledaloyl—Sleeve bearings. Johnson Bronze Co., New Castle, Pa.
Leigh—Roof ventilators. Air Control Products, Inc., Coopersville, Mich.
Lekro-Tektor—Electrolytic devices. Marlo Coil Co., St. Louis, Mo.
Lektro-Kleen—Air cleaners. Lennox Furnace Co., Marshalltown, Ia., Syracuse, N. Y. & Columbus, O.
Leraydo—Zinc sheets. Illinois Zinc Co., Chicago, Ill.
Letheray—Sterilizing lamps. Hanovia Chemical & Mfg. Co., Newark, N. J.
Levalarm—Alarm. Reliance Gauge Column Co., Cleveland, O.
Levelimeter—Indicators, alarms, gages, recorders, regulators, switches. Fischer & Porter Co., Hatboro, Pa.
Levelizer—Gas regulators. Mueller Furnace Co., L. J., Milwaukee, Wis.
Level-Master—Regulators. Sporlan Valve Co., St. Louis, Mo.
Levelometer—Gages, recorders. Liquidometer Corp., Long Island City, N. Y.
Lever-Seald—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.
Level-Temp—Thermostats. White-Rodgers Electric Co., St. Louis, Mo.
Level-Trol—Regulators. Fisher Governor Co., Marshalltown, Ia.
Liberty—Packing. Johns-Manville, New York, N. Y.
Liberty—Ventilators, caps. Penn Ventilating Co., Philadelphia, Pa.
Life Line—Electric motors. Westinghouse Electric Corp., Pittsburgh, Pa.
Light Duty—Pulleys. Gates Rubber Co., The, Denver, Colo.
Lightening Hole—Punches. M-M-A, Inc., Lancaster, Pa.
Lightning—Cleaning compounds. Western Chemical Co., Kansas City, Mo.
Lightweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Lima—Stokers. Carnes, Inc., John R., Lima, O.
Limit-Load—Centrifugal fans. Buffalo Forge Co., Buffalo, N. Y.
Limitorque—Valves, valve operators. Philadelphia Gear Works, Inc., Philadelphia, Pa.
Limpet—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Lincwelder—Welders. Lincoln Electric Co., The, Cleveland, O.
Line—Electric motors, speed reducers. Brown-Brockmeyer Co., Inc., Dayton, O.
Lineflow—Fans. American Blower Corp., Detroit, Mich.
Line-o-flo—Air diffusers, grilles. Barber-Colman Co., Rockford, Ill.
Link-Grip—Pipe wrenches. American Machine Wks., Inc., Racine, Wis.
Lin-X—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Lincolnweld—Arc welders. Lincoln Electric Co., The, Cleveland, O.
Linovector—Heating surface. Vulcan Radiator Co., Hartford, Conn.
Lipco—Cement lined fittings and pipe. Cement Lined Pipe Co., Lynn, Mass.
Lipman—Unit Air Conditioning. Yates-American Machine Co., Beloit, Wisc.
Liquid Eye—Sight glasses. Allin Mfg. Co., Chicago, Ill.
Liquidepth—Indicators. Petrometer Corp., Long Island City, N. Y.
Liquiflux—Welding compounds. Sight Feed Generator Co., West Alexandria, O.
Liqui-Jector—Dehumidifiers, dehydrants, dehydrators. Selas Corp. of America, Philadelphia, Pa.
Lite Cast—Combustion chambers. Monogram Products Co., Inc., Philadelphia, Pa.

Lithcote—Coatings. Lithgow Corp., Chicago.
Lithoform—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Little Blacksmith—Punches, shears. Kidder Mfg. Co., Inc., J. F., Burlington, Vt.
Little Giant—Sump pumps. Chicago Pump Co., Chicago, Ill.
Little Giant—Stock and dies. Greenfield Tap & Die Corp., Greenfield, Mass.
Little Giant—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Little Giant—Pipe crimper tools. Pioneer Tool Company, Racine, Wis.
Livermont—Wrenches, tools. Richmont, Inc., San Gabriel, Calif.
Lloyd—Solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Loadgrip—Hangers and supports. United Industries, Madison, Wis.
Lo-Blast—Burners. Mid-Continent Metal Products Co., Chicago, Ill.
Lo-Fin—Surfaces, tubing. Doyle & Roth Mfg. Co., Inc., Brooklyn, N. Y.
Lo-Veyor—Conveyor. Ajax Flexible Coupling Co., Westfield, N. Y.
Lockaire—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.
Lockseam—Pipe. Naylor Pipe Co., Chicago.
Lockseam—Tubing. Helical Tube Corporation, East Orange, N. J.
Lodi—Boilers. Super Mold Corp., Lodi, Calif.
Lo-K—Insulation. Lockport Cotton Batting Co., Lockport, N. Y.
Lok-Joint—Insulation. Insulite Co., Minneapolis, Minn.
Lolag—Heaters. American Instrument Co., Inc., Silver Spring, Md.
Longlife—Coating. Flexrock Co., Philadelphia, Pa.
Longrip—Pipe extractors. Ridge Tool Co., Elyria, O.
Lookout Heggie-Simplex—Boilers, heaters. Lookout Boiler & Mfg. Co., Chattanooga.
Lord Burnham—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Lo-Set—Stokers. Canton Stoker Corp., Canton, O.
Louvre—Louvers and shutters. Kelvin-White Co., Boston, Mass.
Lowcost—Boilers. Murray Iron Works Co., Burlington, Ia.
Lown—Machines. San Angelo Foundry & Machine Co., San Angelo, Tex.
Low Pressure Drop—Strainers. Zurn Mfg. Co., J. A., Industrial Div., Erie, Pa.
Loxin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Loxit—Fittings. Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Loxite—Pipe covering adhesives. Firestone Industrial Products Co., Akron, O.
Luminite—Boiler cleaning compounds, steam system treatment. Warren Refining & Chemical Co., The, Cleveland, O.
Lyonore Metal—Sheets. Lyon, Conklin & Co., Inc., Baltimore, Md.

M. E.—Fans. New York Blower Co., Chicago, Ill.
M. E.—Motors. Marathon Electric Mfg. Corp., Wausau, Wis.
M. & E.—Cooling surface, tubing, unit coolers, unit heaters. Merchant & Evans Co., Philadelphia, Pa.
M & F—Rubber base enamel. American-Marietta Co., Chicago, Ill.
M & H—Sheets. Matthiessen & Hegeler Zinc Co., La Salle, Ill.
MIF—Couplings, fittings. Malleable Iron Fittings Co., Branford, Conn.
MKO—Pumps. Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., Philadelphia, Pa.
M & M—Alarms, cut-offs, feeders, humidifiers, indicators, operators, pumps, regulators, switches, valves. McDonnell & Miller, Inc., Chicago, Ill.
M-R-C—Ball bearings. Marlin-Rockwell Corp., Jamestown, N. Y.
M-Scope—Pipe locators, leak detectors. Fisher Research Laboratory, Inc., Palo Alto, Calif.
M & T—Welders. Metal & Thermit Corp., New York, N. Y.
M/W and A/C Airmat—Air filters. American Air Filter Co., Inc., Louisville, Ky.
M-VB—Valves. Scovill Mfg. Co., Waterville Div., Waterville, Conn.
Macheta—Fans, fan blades, ventilators. Aerovent Fan Co., Inc., Piqua, O.
Maco—Treated cloth. Menardi & Co., El Segundo, Calif.
Magic—Cement and compounds. Blue Ridge Talc Co., Inc., Henry, Va.
Magic-Aire—Fans, air conditioning units. United Electric Service Co., Wichita Falls, Tex.
Magic Carpet—Door controls. Stanley Works, The, New Britain, Conn.
Magic Dial—Pre-assembled control systems. Midwest Automatic Control Co., Des Moines, Ia.
Magic Eye Door—Door controls. Stanley Works, The, New Britain, Conn.
Magic-Grip—Sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Magic Wire—Control systems wire. Midwest Automatic Control Co., Des Moines, Ia.
Magnefer—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Magne-filter—Cleaners. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Magnehelic—Portable analyzers. Dwyer Mfg. Co., F. W., Chicago, Ill.
Magnetrol—Alarms, boiler cut-offs, switches. Schaub Engineering Co., Fred H., Chicago, Ill.
Magnilastic—Pipe joints and bellows. Cook Electric Co., Chicago, Ill.
Mainliner—Fan blades. Burden Co., Alan E., Los Angeles, Calif.
Make-up Air—Air conditioning units. New York Blower Co., Chicago, Ill.
Manganend—Electrodes. Arcos Corp., Philadelphia, Pa.
Manganweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Manitowoc—Water heaters, tanks. Copper Boiler & Heater Wks., Manitowoc, Wis.
Manotox—Coatings. X-Pando Corp., Long Island City, N. Y.
Manu-Rod—Pipe cleaning machines. Spartan Tool Co., Chicago, Ill.
Marine Independent—Burners. Sun-Ray Burner Mfg. Corp., Jamaica, N. Y.
Mark Time—Time switches. Rhodes, Inc., M. H., Hartford, Conn.
Marocol—Compounds. O'Brien Industries, Caldwell, N. J.
Marvair—Air conditioning units. Muncie Gear Works, Muncie, Ind.
Marvellaire—Air conditioning units. Meyer Furnace Co., The, Peoria, Ill.
Marvelous—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Marvelwite—Enamels and lacquers. Sonneborn Sons, Inc., L., New York, N. Y.
Masco—Combustion chambers. Munn & Steele, Inc., South Boston, Mass.
Mascote—Insulation. Munn & Steele, Inc., South Boston, Mass.
Massachusetts—Fans, unit heaters, blower wheels, air washers, housings. Bishop & Babcock Mfg. Co., Cleveland, O.
Master—Heating systems, valves. Radiator Valve Co. of America, Philadelphia, Pa.
Master—Fittings. Mel Products Co., The, New Haven, Conn.
Master—Stokers. Muncie Gear Wks., Inc., Muncie, Ind.
Master—Speed changers, controls, thermostats, regulators, switches. White Mfg. Co., St. Paul, Minn.
Master—Unions. Jefferson Union Co., Inc., New York, N. Y.
Master—Water heaters. Kehm Corp., The, Chicago, Ill.
Master-Bilt—Pumps. Schaub Engineering Co., Fred H., Chicago, Ill.
Master Kraft—Oil burners, air heaters. Harvey-Whipple, Inc., Springfield, Mass.
Maximon—Gages. J. E. Lonergan Co., Philadelphia, Pa.
Maxsteam—Boilers. Martin Co., Inc., J. O., San Francisco, Calif.
McDaniel—Floats, traps. Watson & McDaniel Co., Philadelphia, Pa.
Measurrench—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Meco—Torches, compounds, gages, regulators, valves, welding rod. Modern Engineering Co., St. Louis, Mo.
Melloblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Mercury—Pipe cutting machines. Obear & Son, W. F., Los Angeles, Calif.
Merrill Process—Heating systems. Parks-Cramer Co., Fitchburg, Mass.
Metakote—Enamels and lacquers. Tropical Paint & Oil Co., Cleveland, O.
Metal-Master—Shears. Wiss & Sons Co., J., Newark, N. J.
Metalflo—Tubes and tubing. H & H Tube & Mfg. Co., Detroit, Mich.
Metalhide—Protective coatings. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Metalite—Enamels and lacquers. Atlas Powder Co., North Chicago, Ill.
Metalprep—Compounds. Nielson Chemical Co., Detroit, Mich.
Metaphram—Valves. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Metco—Ducts and duct fittings. Sheet Metal Mfg. Co., Inc., Brooklyn, N. Y.
Metermax—Thermometers. Leeds & Northrup Co., Philadelphia, Pa.
Met-L-Flex—Bases and pads. Robinson Aviation, Inc., Vibrashock Div., Teterboro, N. J.
Metl-Tech—Doors and panels, metal sheets. Technical Ply-Woods, Chicago, Ill.
Metric—Meters. American Meter Co., Inc., New York, N. Y.
Metrotherm—Thermostats. General Controls Co., Glendale, Calif.
Micafil—Insulation. Munn and Steele, Inc., South Boston, Mass.
Mico—Insulation. Mineral Insulation Co., Chicago Ridge, Ill.
Micro—Low water cut-offs. Maid-O'-Mist, Inc., Chicago, Ill.
Micro-Feed—Humidifiers. Cleveland Humidifier Co., Cleveland, O.
Micr-O-Feeder—Proportioning pumps. % Proportioneers, Inc. %, Providence, R. I.
Micro-Klean—Filters. Cuno Engineering Corp., Meriden, Conn.
Microlite—Insulation. Glass Fibers, Inc., Toledo, O.
Micromax—Recorders, indicator and recorder-controllers, thermometers. Leeds & Northrup Co., Philadelphia, Pa.
Micromet—Water treatment. Calgon Inc., Pittsburgh, Pa.
Micromotors—Motors. Redmond Co., Inc., Owosso, Mich.
Micro-Netic—Feeders. Campbell Co., J. A., Long Beach, Calif.
MicroRold—Sheets. Washington Steel Corp., Washington, Pa.
Micro-Shot—Pumps, water treatment. %Proportioneers, Inc.,% Providence, R. I.
Microtherm—Thermostats. Barber-Colman Co., Rockford, Ill.
Microvac—Pumps. Stokes Machine-Co., F. J., Philadelphia, Pa.
Micro-Weld—Spot welders. Micro Products Co., Chicago, Ill.
Midget—Radiation. Utica Radiator Corp., Utica, N. Y.
Midget Powerhouse—Unit heaters. Century Engineering Corp., Cedar Rapids, Ia.
Midget Waterboy—Float valves. Maid-O'-Mist, Inc., Chicago, Ill.
Mighty Midget—Drills. Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.
Mighty Mite—Thermostats. Mechanical Industries Production Co., Akron, O.
Milcor—Doors and panels. Inland Steel Products Co., Milwaukee, Wis.
Milford—Tools. Thompson & Son Co., The, Henry G., New Haven, Conn.
Mills—Boilers. Smith Co., Inc., H. B., The, Westfield, Mass.
Milvaco—Air eliminators, floats, strainers, traps, valves. Milwaukee Valve Co., Milwaukee, Wis.
Minicordes—Recorders. Dickson Co., The, Chicago, Ill.
Minneapolis—Compressors. North Penn Co., New York, N. Y.
Mipco—Valves. Marine & Industrial Products Co., Philadelphia, Pa.
Miracle Red—Coatings. Debevoise Co., The, Brooklyn, N. Y.
Mir-O-Meter—Combustion control systems. Bowser, Inc., Fort Wayne, Ind.
Mirrolac—Enamels and lacquers. Devoe & Raynolds Co., Inc., New York, N. Y.
Mixend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
MKAYO—Boilers. Mears-Kane-Ofeldt Inc., Div. S. T. Johnson Co., Philadelphia, Pa.
Moderator—Heating System. Warren Webster Co., Camden, N. J.
ModernAire—Fans, unit air conditioners. National Gas Equipment Co., Inc., Terrell, Tex.
Modu-Aire—Air conditioning units. United States Air Conditioning Corp., Minneapolis, Minn.
Moduflow—Control systems. Minneapolis-Honeywell Regulator Co., Minneapolis.
Modustat—Valves. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modutrol—Heating systems, valve and duct operators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Modutron—Regulators. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Mogul—Packing. Johns-Manville, New York, N. Y.
Mogul—Boiler cleaning compounds and water treatment. North American Mogul Products Co., The, Cleveland, O.
Moisture Magnet—Dehumidifiers. Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Monel—Pipe fittings, flanges, pipe, sheets, tubing. International Nickel Co., Inc., The, New York, N. Y.
Monend—Arc welding electrodes. Arcos Corp., Philadelphia, Pa.
Mongol—Pipe joint cement and compounds. Baer Bros., New York, N. Y.
Monmouth—Filters, humidifiers, valves. Cleveland Humidifier Co., Cleveland, O.
Mono-Block—Insulation. Baldwin-Hill Co., Trenton, N. J.
Monobolt—Chillers, oil coolers, water heaters. Graham Mfg. Co., Inc., New York, N. Y.
Mono-Cast—Pipe. American Cast Iron Pipe Co., Birmingham, Ala.
Monocast—Refractories and refractory cement. Ramtite Co., The, Chicago, Ill.
Monoflo—Hot water heating systems and fittings. Bell & Gossett Co., Morton Grove, Ill.
Mono-Line—Refractories. Quigley Co., Inc., New York, N. Y.
Monoloct—Heat exchangers. Graham Mfg. Co., Inc., New York, N. Y.
Monomotors—Motors. Redmond Co., Inc., Owosso, Mich.
Mono-Peen—Enamels and lacquers. Interchem-

ical Corp., Finishes Div., Newark, N. J.
Monovent—Ventilators. Burt Mfg. Co., Akron, O.
Monsoon—Fans, grilles, louvers. Jamieson Mfg. Co., Dallas, Texas.
Morflex—Flexible couplings. Morse Chain Co., Detroit, Mich.
Morgrip—V belts. Maurey Mfg. Corp., Chicago, Ill.
Mor-Heat—Treatment to inhibit corrosion, compounds. Moreheat Distribution, Inc., Cincinnati, O.
Morlex—Steam system treatment. Carbide & Carbon Chemicals Co., A Div. of Union Carbide and Carbon Corp., New York, N. Y.
Mortairset—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Mortite—Gaskets. Mortell Co., J. W., Kankakee, Ill.
Moto-Merco—Relays. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Motopump—Pumps. Yeomans Bros. Co., Melrose Park, Ill.
MotoReducer—Speed reducers. Philadelphia Gear Works, Inc., Philadelphia, Pa.
Motorstoker—Stokers. Hershey Machine & Foundry Co., Motorstoker Div., Manheim, Pa.
Motosteel—Valves. Taylor Instrument Companies, Rochester, N. Y.
Mototurb—Ventilators. Uno Ventilator Co., Malden, Mass.
Mouat—Compounds, eliminators, traps. Squires Co., C. E., The, Cleveland, O.
Mountain Air—Air conditioning units. Central States Mfg. Co., Inc., Arkansas City, Kan.
Muckle-Vent—Ventilators. Muckle Mfg. Co., Owatonna, Minn.
Muffletone—Insulation. Celotex Corp., The, Chicago, Ill.
Mullitex—Refractories. Walsh Refractories Corp., St. Louis, Mo.
Mult-Au-Matic—Threading and boring machines. Bullard Co., The, Bridgeport, Conn.
Multiblade—Welding fume exhausters. General Blower Co., Morton Grove, Ill.
Multiclone—Dust collectors. Western Precipitation Corp., Los Angeles, Calif.
Multi-Duty—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Multiduty—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.
Multi-Flex—Ducts and duct fittings. United States Rubber Co., New York, N. Y.
Multilarm—Alarms. Automatic Control Co., St. Paul, Minn.
Multiplane—Vibration isolating bases. Lord Mfg. Co., Erie, Pa.
Multi-Seal—Bolts, repair plugs. Kenney Co., L. C., Chicago, Ill.
Multitherm—Air conditioning units. Clarage Fan Co., Kalamazoo, Mich.
Multi-Tip—Gas burners. Dalzen Mfg. Co., St. Clair, Mich.
Multi-V—V-belts. Goodrich Co., B. F., Akron.
Multivane—Fans, blowers, unit heaters. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Multi-V-Drive—Drives. Worthington Corp., Harrison, N. J.
Multi-Vent—Diffusers, air diffusion panels. Multi-Vent Div., Pyle-National Co., The, Chicago, Ill.
Multi-Vise—Pipe vises. American Implement Co., Omaha, Neb.
Multi-Wash—Dust collectors. Schneible Co., Claude B., Detroit, Mich.
Murco—Humidifiers. Murray Mfg. Co., D. J., Wausau, Wis.
Murex—Welding electrodes. Metal & Thermit Corp., New York, N. Y.

NCG—Solder, torches, welding rod. National Cylinder Gas Co., Chicago, Ill.
N-M-D—Valves. Lunkenheimer Co., Cincinnati, O.
NYB Steelfin—Heating surface. New York Blower Co., Chicago, Ill.
Nalco—Solder. National Lead Co., New York, N. Y.
Nalco—Feeders, water treatment, soot destroyers. National Aluminate Corp., Chicago, Ill.
National—Boilers, heaters. National Radiator Co., The, Johnstown, Pa.
National—Fans, furnaces. MaGirl Foundry & Furnace Co., Bloomington, Ill.
National—Heaters. Mid-Continent Metal Products Co., Chicago, Ill.
National—Pipe, tubes, tubing. National Tube Div., United States Steel Co., Pittsburgh.
National—Pipe cutters. Wachs Co., E. H., The, Chicago, Ill.
National Art—Convection radiation, heat exchangers. National Radiator Co., The, Johnstown, Pa.
National-Champion—Furnaces, air heaters. National Heater Co., St. Paul, Minn.
Natur Temp—Insulation. Plastergon Wall Board Co., Buffalo, N. Y.
Naturzone—Insulation. Wilson & Co., Inc., Chicago, Ill.
Navalon—Fiber packing. Johns-Manville, New York, N. Y.
Nelson—Stokers, pumps, air conditioning units. Heating Assurance, Inc., Spokane.
Nelweld—Welders. Nelson Stud Welding Div., Gregory Industries, Inc., Lorain, O.
Nemo—Insulating cement. Smith & Kanzler Corp., Linden, N. J.
Nerva-Plast—Protective coatings. Rubber and Plastics Compound Co., New York, N. Y.
Nesbitt—Heaters. Webster & Co., Warren, Camden, N. J.
New Cyclone—Dust collectors. Kirk & Blum Mfg. Co., Cincinnati, O.
New Multifin—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Niagara—Meters. Buffalo Meter Co., Buffalo, N. Y.
Nibco—Fittings, flanges, joints, valves. Northern Indiana Brass Co., Elkhart, Ind.
Nibcoloy—Fittings, pipe, stainless steel. Northern Indiana Brass Co., Elkhart, Ind.
Nickelend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nickend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nicloy—Pipe, tubes, tubing. Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Nicolet—Insulation. Sall Mountain Co., Hamilton, O.
Nicuend—Electrodes. Arcos Corp., Philadelphia, Pa.
Nite Cool—Fans. Air Equipment Co., Chicago, Ill.
No Drip—Insulation, protective coatings. J. W. Mortell Co., Kankakee, Ill.
Nocordal—Pipe coils, refrigerating condensers, and heat exchangers. Heil Process Equipment Corp., Cleveland, O.
Non-clog—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Non-clog—Pipe line strainers. Boylston Steam Specialty Co., Chicago, Ill.
Non-Clogging—Spray nozzles. Link-Belt Co., Chicago, Ill.
Non-Con-Dux—Cement, insulation. Grant Wilson, Inc., Chicago, Ill.
Non-Frost—Insulation. Keasbey & Mattison Co., Ambler, Pa.
Nonisol—Sludge prevention treatment. Alrose Chemical Co., Providence, R. I.
Non-Sweat—Insulation. Keasbey & Mattison Co., Ambler, Pa.
No-Ox-Id—Protective coatings. Dearborn Chemical Co., Chicago, Ill.
Norblo—Dust collectors, fans. Northern Blower Co., Cleveland, O.
Nordstrom—Valves. Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Northwestern—Water heaters. Coe Mfg. Co., Painesville, O.
Northwind—Unit air coolers. Pleasantaire Corp., Washington, D. C.
Norwesco—Cement and compounds, boiler and radiator sealing compounds. Atlas Chemical Co., Marietta, O.
No-Spat—Welding compounds. Midland Paint & Varnish Co., Cleveland, O.
No-Thread—Fittings. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
No-Vent—Pumps. Stout & Sons, David, St. Louis, Mo.
Novoid—Insulation, adhesives, vibration isolating bases. National Cork Co., Englewood, N. J.
Nox-Odor—Odor adsorber. Tamms Industries, Inc., Chicago, Ill.
Nu-Air—Adsorbers. Aerotrol Engineering Co., Pittsburgh, Pa.
Nu-Air—Fans, window ventilator units. Meier Electric & Machine Co., Inc., Indianapolis, Ind.
Nu-Alpina—Ventilators. Inland Steel Products Co., Milwaukee, Wis.
Nu-Grip—Shears and snips. Wiss and Sons Co., J., Newark, N. J.
Nullmatic—Gages, indicators, meters, recorders. Moore Products Co., The, Philadelphia, Pa.
Nu-Notch—Mushroom ventilators. Knowles Mushroom Ventilator Co., Upper Montclair, N. J.
Nuvent—Ventilators. Aeolus Dickinson, Chicago, Ill.
Nu-Wood—Insulation. Wood Conversion Co., St. Paul, Minn.
Nyavco—Valves, gages. New York Air Valve Corp., Brooklyn, N. Y.
Nylined—Sleeve bearings. Thomson Industries, Inc., Manhasset, N. Y.

OB—Valves, Ohio Brass Co., Mansfield, O.
O'B-Aid—Compounds. O'Brien Industries, Caldwell, N. J.
O'B-Aige—Water treatment. O'Brien Industries, Caldwell, N. J.
O'B-Col—Compounds. O'Brien Industries, Caldwell, N. J.
O'B-Ox—Water treatment. O'Brien Industries, Caldwell, N. J.
OCH—Filters. American Air Filter Co., Louisville, Ky.
O.E.M.—Flue caps, combustion chambers, cement and compounds. Oil Equipment Mfg. Corp., New Haven, Conn.
Oakwood—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Oasis—Electric dehumidifiers. Ebco Mfg. Co., Columbus, O.
O'Both—Water treatment. O'Brien Industries, Caldwell, N. J.
O'Burnit—Soot destroyers. O'Brien Industries, Caldwell, N. J.
Octopus—Welding fume exhausters. Chelsea Fan & Blower Co., Inc., Plainfield, N. J.
Oil-A-Fire—Burners. Automatic Firing Corp. St. Louis, Mo.
Oilbuster—Boiler cleaning compounds. Cannon Chemical Co., Inc., Cambridge, Mass.
Oil-O-Matic—Oil burners, heaters. Williams Oil-O-Matic Div., Eureka Williams Corp., Bloomington, Ill.
Oiltex—Gaskets. Chicago Gasket Co., Chicago, Ill.
Oilway—Oil fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Okay Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.
Ol' Faithful—Humidifiers. Maid-O'-Mist, Inc., Chicago, Ill.
One Venturi—Heating systems. Taco Heaters, Inc., Providence, R. I.
Oriflex—Valves. Dunham Co., C. A., Chicago, Ill.
Ori-Flowrator—Flow measuring orifices. Fischer & Porter Co., Hatboro, Pa.
Ovaltube—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Oversize—Refrigerant dehydrators. Wabash Mfg. Co., Chicago, Ill.
Oxequip—Oxygen systems. Oxygen Equipment & Service Co., Chicago, Ill.
Oxweld—Welding rod, welding and cutting apparatus. Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Oxyarc—Welding and cutting apparatus. Arcos Corp., Philadelphia, Pa.
Oxycuttend—Electrodes. Arcos Corp., Philadelphia, Pa.
Oyltite-Stik—Cements and compounds. Lake Chemical Co., Chicago, Ill.
Ozite—Insulation. American Hair & Felt Co., Chicago, Ill.

P. B. H.—Cocks, try cocks. Paul B. Huyette Co., Inc., Philadelphia, Pa.
P-D—Fittings. Sullivan Valve & Engineering Co., Butte, Mont.
P-D—Pumps. Peters-Dalton, Inc., Detroit, Mich.
PD—Blowers, dust collectors, stacks and chimneys, fans. Prat-Daniel Corp., East Port Chester, Conn.
PD QC—Pipe machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.
P & H—Blue print machines. Peck & Harvey, Chicago, Ill.
P & H—Welding electrodes, arc welders. Harnischfeger Corp., Milwaukee, Wis.
P. I. V. Gear—Speed changers. Link-Belt Co., Philadelphia, Pa.
Pacemaker—Coolers. McQuay, Inc., Minneapolis, Minn.
Pacific—Unit Heaters. Palmer Mfg. Corp., Phoenix, Ariz.
Pacific—Furnaces. Rosebraugh Co., W. W., Salem, Ore.
Pacific Coast—Refrigerant dehydrators. Wabash Mfg. Co., Chicago, Ill.
PAINTGRIP—Sheets. Armco Steel Corp., Middletown, O.
Paladin—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Palco—Packing. Greene, Tweed & Co., North Wales, Pa.
Palco Wool-Saferized—Insulation. Pacific Lumber Co., The, San Francisco, Calif.
Palmaire—Furnaces, unit heaters, humidifiers. Palmer Mfg. Corp., Phoenix, Ariz.
Palmetto—Packing, Greene, Tweed & Co., North Wales, Pa.
Palmetto SuperSheat—Gaskets. Greene, Tweed & Co., North Wales, Pa.
Panelair—Heaters. Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Panelray—Gas fired suspended heaters. Day & Night Div., Affiliated Gas Equipment, Inc., Monrovia, Calif.
Pan-L-Grid—Coils and panels. Pan-L-Heat Corp., Portland, Ore.
Par—Air compressors. Lynch Corp., Toledo, O.
Paracoil—Coils, condensers, heaters, oil coolers, pipe nipples, preheaters, steam traps, water chillers, aftercoolers, heating units, valves, vaporizers. Davis Engineering Corp., Elizabeth, N. J.
Paraline—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Parasol—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Pathfinder—Belting. Goodyear Tire & Rubber Co., Akron, O.
Pedrifugal—Centrifugal pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Peerless—Pipe machines. Bignall & Keeler Div., John Ramming Machine Co., St. Louis, Mo.

Peerless—Direct radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Peerless—Industrial stokers. Eddy Stoker Corp., Chicago, Ill.
Pelro—Asbestos packing. Greene, Tweed & Co., North Wales, Pa.
Penco—Plastic fittings, pipe. North Penn Co., New York, N. Y.
Penflex-Weld—Absorbers. Pennsylvania Flexible Metallic Tubing Co., Philadelphia, Pa.
Pennco—Sectional cast iron boilers. Pennsylvania Furnace & Iron Co., Warren, Pa.
Penn Dynafan—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Penn-M-Co—Fittings. Penn Mfg. Corp., of Washington, Pa., Washington, Pa.
Penn-Power—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Penn-Turbine—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Pennsalt—Cleaning compounds. Pennsylvania Salt Mfg. Co., Philadelphia, Pa.
Perfectaire—Heaters, furnaces. Air Conditioning Engineering Co., Cambridge, Mass.
Perfection—Plates. Beaton & Cadwell Mfg. Co., New Britain, Conn.
Perfection—Valves. American District Steam Co., Inc., North Tonawanda, N. Y.
Perfecto—Boiler parts, cement. Green Fire Brick Co., Mexico, Mo.
Permadine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Permanite—Plastic Pipe. Knight, Maurice A., Akron, O.
Permaseal—Gaskets. Chicago Gasket Co., Chicago, Ill.
PeroNite—Soot destroyers. Perolin Co., Inc., Chicago, Ill.
Peteco—Insulating cement, chambers. Peterson Co., B. A., Dowagiac, Mich.
Pexto—Brakes, punches, shears, wrenches, machines. Peck, Stow & Wilcox Co., Southington, Conn.
Phenolex—High temperature paint. Claronex Products, Inc., Brooklyn, N. Y.
Pic—Malleable unions. Dart Union Co., E. M., Providence, R. I.
Pic—Steel unions. Fairbanks Co., The, New York, N. Y.
Pier—Spot welders. Peer, Inc., Benton Harbor, Mich.
Pilotstat—Flame failure controls. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pioneer—Thermostats. Crown Controls Co., Inc., New Bremen, O.
Pipe Line—Strainers. Anderson Co., V. D., The, Cleveland, O.
Pipe Master—Pipe wrenches. Erie Tool Wks., Erie, Pa.
Pipeasy—Pipe Cement. Flexrock Co., Philadelphia, Pa.
Pipe Master—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Pipemaster—Wrenches. Erie Tool Wks., Erie, Pa.
Pipetite-Stik—Cements and compounds. Lake Chemical Co., Chicago, Ill.
Pitchlign—Roller bearings. Roller Bearing Co., of America, Trenton, N. J.
Pittairaide—Air sterilizing units. Pittsburgh Chemical Laboratories, Inc., Pittsburgh, Pa.
Pittsburgh—Unit heaters. Automatic Gas Equipment Co., Pittsburgh, Pa.
Pittsburgh-National—Meters. Rockwell Mfg. Co., Meter & Valve Div., Pittsburgh, Pa.
Planeweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.
Plasgon—Cement and compounds. Samuel Cabot, Inc., Boston, Mass.
Plastic Gasket—Pipe cement. Flexrock Co., Philadelphia, Pa.
Plasticote—Electric wire. Chester Cable Corp., Chester, N. Y.
Plastoid—Furnace cement. Plastic Products Co., Detroit, Mich.
Platecoil—Coils. Kold-Hold Manufacturing Co., Lansing, Mich.
Playford—Stokers. Rosedale Foundry & Machine Co., Pittsburgh, Pa.
Plexifin—Unit heaters. Bayley Blower Co., Milwaukee, Wis.
Plexiform—Fans. Bayley Blower Co., Milwaukee, Wis.
Plexiform Junior—Unit ventilators. Bayley Blower Co., Milwaukee, Wis.
Plicast—Refractories. Plibrico Jointless Firebrick Co., Chicago, Ill.
Pliojet—Jets for smoke abatement. Plibrico Jointless Firebrick Co., Chicago, Ill.
Pliotron—Filters. Goodyear Tire & Rubber Co., Akron, Ohio.
Plisulate—Insulating cement and insulation. Plibrico Jointless Firebrick Co., Chicago.
Plumber Krak-Stik—Cement and compounds. Lake Chemical Co., Chicago, Ill.
Plumrite—Pipe. Bridgeport Brass Co., Bridgeport, Conn.
Plymouth—Stokers. Clizbe Bros. Mfg. Co., Plymouth, Ind.
Plymouth—Stokers. Plymouth Industries, Inc., Plymouth, Ind.
Ply-Tech—Plywood sheets and board. Technical Ply-Woods, Chicago, Ill.
Pneumastat—Aftercoolers. Schramm, Inc., West Chester, Pa.
Pneumatractor—Aftercoolers. Schramm, Inc., West Chester, Pa.
Pneumatronic—Electronic and pneumatic temperature control equipment. Johnson Service Co., Milwaukee, Wis.
Poeco—Insulation. Poe Co., C. W., Cleveland, O.
Polartron—Relays, regulators, switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Pollenex—Humidifiers. Associated Mills, Chicago, Ill.
Polymerin—Protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Polymeroid—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Polytherm—Protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Pony—Pipe clamps. Adjustable Clamp Co., Chicago, Ill.
Poronze—Filters. Wabash Mfg. Co., Chicago.
Poro-Stone—Filters. Adams Co., Inc., R. P., Buffalo, N. Y.
Porta-Heet—Heaters. Auburn Burner Co., Auburn, Ind.
Port-A-Pony—Pipe cutting machines. Thread Ezy Mfg. Co., Corunna, Mich.
Porta Drive—Pipe cutting machines. Muncie Gear Wks., Inc., Muncie, Ind.
Porto-Power—Pipe benders and pipe pushers, pumps, punches. Blackhawk Mfg. Co., Milwaukee, Wis.
Porto Shears—Shears. Black & Decker Mfg. Co., Towson, Md.
Portovent—Hose. American Ventilating Hose Co., New York, N. Y.
Posit-Aire—Roof ventilators. Tripar Products, Inc., Royal Oak, Mich.
Positive Arc—Arc welders. Welding Apparatus Co., Chicago, Ill.
POWair Saver—Propeller fans. Pritchard & Co., J. F., Equipment Div., Kansas City.
Poweraire—Furnaces. Jackson & Church Co., Saginaw, Mich.
Powerated—Furnaces. Jackson & Church Co., Saginaw, Mich.
Power—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.
Power Gems—Boilers. Edge Moor Iron Works, Inc., Edge Moor, Del.
Power-Flame—Leak detectors. Justrite Mfg. Co., Chicago, Ill.
Power House—Sump pumps. Weil Pump Co., Chicago, Ill.
Powermaster—Boilers. Orr & Sembower, Inc., Reading, Pa.
Poweroil—Oil burners. Jackson & Church Co., Saginaw, Mich.
Power-Poise—Electric motors. Brown-Brockmeyer Co., Inc., Dayton, O.
Prasco—Insulation. Pabco Products Inc., San Francisco, Calif.
Pratt & Cady—Valves. R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Precipitron—Air cleaners. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Precision—Nozzles. Benjamin Air Rifle Co., St. Louis, Mo.
Precision Molded—Insulation. Pabco Products Inc., San Francisco, Calif.
Premier—Welding rod. American Steel & Wire Co., United States Steel Corp. Subsidiary, Cleveland, O.
Pre-Notch—Ducts and duct fittings. Gray Metal Products, Inc., Rochester, N. Y.
Prepo—Brazing and soldering torches. Pressure Products Corp., Skokie, Ill.
Pressuregraph—Indicator-controllers, gages, recorders. Electro Products Laboratories, Inc., Chicago, Ill.
Pressure-Link—Gages. J. E. Lonergan Co., Philadephia, Pa.
Pressuretrol—Regulators, switches. Minneapolis-Honeywell Regulator Co., Minneapolis.
Prestal—Pipe and tube benders. Tal Bender, Inc., Milwaukee, Wis.
Prestico—Furnace cement. Presstite Engineering Co., St. Louis, Mo.
Prest-O-Lite—Leak detectors, torches. Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Presto-Lock—Couplings. Drinkwater, Inc., Waukegan, Ill.
Presto-Lock—Couplings. Smith, J. V., Oak Park, Ill.
Prest-O-Weld—Welding and cutting apparatus. Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York.
Princo—Gages, manometers, psychrometers, regulators, relays, thermometers, thermostats. Precision Thermometer and Instrument Co., Philadelphia, Pa.
Propeloflo—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Prop-R-Temp.—Air conditioning units. Typhoon Air Conditioning Co., Inc., Brooklyn, N. Y.
Protectoglo—Controls. Minneapolis-Honeywell Regulator Co., Instruments Div., Philadelphia, Pa.
Protectomotor—Air filters, separators. Dollinger Corp., Rochester, N. Y.
Protector—Lamps. M-M-A, Inc., Lancaster, Pa.
Protect-O-Ray—Lamps. Lustra Corp. of America, Brooklyn, N. Y.
Protectorelay—Flame failure controls, relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Proxlin—Enamels and lacquers. Acme White Lead & Color Works, Detroit, Mich.
Pryzoak—Belting. Graton & Knight Co., Worcester, Mass.
Puffglass—Filters. Drico Industrial Corp., New York, N. Y.
Pul-Air—Ventilators. Lyon, Conklin & Co., Inc., Baltimore, Md.
Pul Air—Ventilators. Penn Ventilating Co., Philadelphia, Pa.
Pulsorb—Gages. Lonergan Co., J. E., Philadelphia, Pa.
Pulling—Circulators, pumps. Columbus Steam Pump Works Co., Columbus, O.
Pulverzone—Stokers. American Coal Burner Co., Chicago, Ill.
Punkah—Louvers and shutters. White & Sons, Inc., Wilfred O., Boston, Mass.
Puridryer—Dehumidifiers. Pritchard & Co., J. F., Equipment Div., Kansas City, Mo.
Pur-O-Fiers—Filters, separators. Air Conversion Research Corp., Chicago, Ill.
Pur-O-Cel—Water filters. % Proportioneers, Inc. %, Providence, R. I.
Purox—Welding and cutting apparatus. Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., New York, N. Y.
Pylets—Switches, pilot and signal lights. Pyle-National Co., The, Chicago, Ill.
Pyratherm—Controls. Mercoid Corp., The, Chicago, Ill.
Pyrex—Glass pipe, heat exchangers, gage and sight glasses. Corning Glass Wks., Corning, N. Y.
Pyro—Thermometers, recorders, regulators. Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.
Pyrofax—Propane gas refrigerant. Carbide and Carbon Chemicals Corp., New York, N. Y.
Pyroflex—Coatings, lined pipes, tanks, enamels and lacquers. Knight, Maurice A., Akron, O.
Pyromaster—Regulators. Bristol Co., The, Waterbury, Conn.
Pyrotrol—Flame failure controls. Bristol Co., The, Waterbury, Conn.
Pyrotron—Recorders. Bailey Meter Co., Cleveland, O.
Pyrovisor—Controls. Bristol Co., The, Waterbury, Conn.

QD—Pulleys and sheaves. Worthington Corp., Harrison, N. J.
Q-T—Insulation. Celotex Corp., The, Chicago, Ill.
Q-Chromastic—Refractories. Quigley Co., Inc., New York, N. Y.
Q-Chrome—Refractories. Quigley Co., Inc., New York, N. Y.
Q-Seal-Damit—Boiler sealing compounds. Quigley Co., Inc., New York, N. Y.
Quad—Fans. Trade-Wind Motorfans, Inc., Los Angeles, Calif.
Quantrol—Vanes. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Quartzoid—Sprinkler heads. Grinnell Co., Inc., Providence, R. I.
Quick-as-Wink—Valves. C. B. Hunt & Son, Inc., Salem, O.
Quick-Clip—Insulation fasteners. Nelson Stud Welding Div., Gregory Industries, Inc., Lorain, O.
Quick-Label—Identification markers. Brady Co., W. H., Chippewa Falls, Wis.
Quiet Kool—Cooling units. Quiet-Heet Mfg. Corp., Newark, N. J.
Quik-Mask—Gaskets. Brady Co., W. H., Chippewa Falls, Wis.
Quik-Temp—Steam traps. Schaub Engineering Co., Fred H., Chicago, Ill.
Quikupl—Couplings. Cooper Alloy Foundry Co., The, Hillside, N. J.
Quikupl—Pipe fittings. Frasse & Co., Peter A., New York, N. Y.
Quintair—Heat exchangers. Pritchard & Co., J. F., Kansas City, Mo.
Quintex—Heat exchangers. Pritchard & Co., J. F., Kansas City, Mo.
Quintube—Heat exchangers. Pritchard & Co., J. F., Kansas City, Mo.

RBC—Roller bearings. Roller Bearing Co. of America, Trenton, N. J.
RB Pressure—Pressure blowers. Western Blower Co., Seattle, Wash.
RC—Couplings. Link-Belt Co., Indianapolis, Ind.
R. D.—Valves. Grinnell Co., Inc., Providence, R. I.
R & G—Grilles, registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
RH—Air conditioning units. McQuay, Inc., Minneapolis, Minn.
R. I.—Unions. Rhode Island Fittings Co., Providence, R. I.

R-K—Combustion control systems, regulators, valves. Ruggles-Klingemann Mfg. Co., Boston, Mass.
R & M All-Weather—Motors. Robbins & Myers, Inc., Springfield, O.
R-M—Packing. Raybestos-Manhattan, Inc., Passaic, N. J.
R. M. B.—Ball bearings. Landis & Gyr, Inc., New York, N. Y
R & M Moyno—Pumps. Robbins & Myers, Inc, Springfield, O.
R-Mir-Dek—Protective coatings. Miracle Adhesives Corp., New York, N. Y.
RP—Air filters, water softeners. Research Products Corp., Madison, Wis.
R P M—Sheet metal. Robertson Co., H. H., Pittsburgh, Pa.
RTC—Valves. Sullivan Valve & Engineering Co., Butte, Mont.
R-U-F—Fans. Reed Unit-Fans, Inc., New Orleans, La.
R-Z-U Junior—Fire tube boilers. Fitzgibbons Boiler Co., Inc., New York, N. Y.
Radiafin—Finned tubing, finned surface. Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Radiantweld—Tubing. Avon Tube Div., Higbe Mfg. Co., Rochester, Mich.
Radioflow—Valves. Smolensky Valve Co., Inc., Bedford, O.
Radiant—Direct radiation. Burnham Corp., Boiler Div., Irvington, N. Y.
Radiantrim—Radiation. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Radiantrol—Valves. Homestead Valve Mfg. Co., Coraopolis, Pa.
Radi-Aire—Propeller fans. Reynolds Electric Co., River Grove, Ill.
Radi-Ion—Ionization apparatus. Montgomery Bros., San Francisco, Calif.
Radi-Vector—Radiation. Vulcan Radiator Co., Hartford, Conn.
Radolite—Cement, refractories. Pyrolite Products Co., Cleveland, O.
Rador—Thermostats. Vapor Heating Corp., Chicago, Ill.
Raintite—Ventilators. Aeolus Dickinson, Chicago, Ill.
Rajah—Packing. Johns-Manville, New York, N. Y.
Ramapo—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Ramset—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Ranarex—Analyzers, indicators, recorders. Permutit Co., New York, N. Y.
Rapid—Oil coolers. Bell & Gossett Co., Morton Grove, Ill.
Rapiduction—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Ratochlor—Steam and water treatments. Fischer & Porter Co., Hatboro, Pa.
Ratogage—Indicator-controllers, recorder-controllers, recorders. Fischer & Porter Co., Hatboro, Pa.
Ratosight—Alarms, flow switches. Fischer & Porter Co., Hatboro, Pa.
Ratotherm—Gages, indicator-controllers, recorder-controllers, recorders, and thermometers. Fischer & Porter Co., Hatboro, Pa.
Ratovane—Valves. Fischer & Porter Co., Hatboro, Pa.
Rawl-Anchor—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Rawldrill—Drills for masonry. Rawlplug Co., Inc., The, New York, N. Y.
Rawl-Drive—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Rawl Taper—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Rawl Toggles—Bolts. Rawlplug Co., Inc., The, New York, N. Y.
Raychronix—Leak detectors. Radioactive Products, Inc., Detroit, Mich.
Raydiant—Radiation. Weil-McLain Co., Michigan City, Ind.
Rayduct—Pipe. Bethlehem Steel Co., Bethlehem, Pa.
Raymaster—Refrigerant leak detectors. George W. Gates & Co., Inc., Franklin Sq., L. I., N. Y.
Reading—Fittings, valves. R-P & C Valve Div., American Chain & Cable Co., Inc., Reading, Pa.
Ready-Pack—Clamps. Dresser Mfg. Div., Dresser Industries, Inc., Bradford, Pa.
Recirculair—Unit heaters. New York Blower Co., Chicago, Ill.
Reco—Steam convertors, heat exchangers, headers, heaters, preheaters, tanks, unit coolers. Richmond Engineering Co., Richmond, Va.
Reco—Controllers and starters, motors, propeller fans, switches. Reynolds Electric Co., River Grove, Ill.
Recold—Refrigerating evaporative condensers, coolers, cooling & heating surface, cooling towers, air conditioning units. Refrigeration Engineering, Inc., Los Angeles, Calif.
Reco—Radi-Aire—Fans. Reynolds Electric Co., Chicago, Ill.
Record-O-Stat—Recorder-controllers. Johnson Service Co., Milwaukee, Wis.
Recoy—Chillers, condensers, cooling surface, unit air conditioners and coolers. Refrigeration Economics Co., Inc., Canton, O.
Red—Compressors, controllers and starters, heaters, indicators, operators, regulators, switches, thermostats. Cooper Co., Clark, Palmyra, N. J.
Red Cap—Ventilators, Warner Ventilator Co., La Grange, Ind.
Red Devil—Furnace and pipe joint cement. Pecora Paint Co., Philadelphia, Pa.
Red Flash—Traps. Ellis Drier Co., Chicago, Ill.
Red Head—Tongs. Billings & Spencer Co., Hartford, Conn.
Red Head—Traps. Ellis Drier Co., Chicago, Ill.
Redi-Bends—Coils. Capitol Mfg. & Supply Co., Columbus, O.
Redi—Stokers. General Machinery Co., Spokane, Wash.
Redi-Return—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Red Seal—Gaskets. Chicago Gasket Co., Chicago, Ill.
Redi-Vac—Pumps. American-Marsh Pumps, Inc., Battle Creek, Mich.
Red-Reading-Mercury—Hygrometers, psychrometers, thermometers. Palmer Thermometers, Inc., Cincinnati, O.
Red Seal—Engines. Continental Motors Corp., Muskegon, Mich.
Red Socket—Wrenches. Lowell Wrench Co., Worcester, Mass.
Red Top—Humidistats, thermostats. H-B Instrument Co., Philadelphia, Pa.
Red Top—Insulation. United States Gypsum Co., Chicago, Ill.
Red Top—Concrete inserts. Leibfried Mfg. Corp., C. H., Brooklyn, N. Y.
Redycote—Coatings. Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Reformend—Electrodes. Arcos Corp., Philadelphia, Pa.
Refrak Screen—Gas burners. Selas Corp. of America, Philadelphia, Pa.
Rego—Regulators, valves, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.
Reinhard—Gas burners. LaHarco Industries, Minneapolis, Minn.
Reiser—Valves. Homestead Valve Mfg. Co. Coraopolis, Pa.
Relatrol—Heating systems. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Reliance—Regulators. American Meter Co., Inc., New York, N. Y.
Remotaire—Air conditioning units. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Remote—Indicators. Yarnall-Waring Co., Philadelphia, Pa.
Renewo—Valves. Lunkenheimer Co., Cincinnati, O.
Renu-Glas—Air filters. American Air Filter Co., Inc., Louisville, Ky.
Research—Belting. Graton & Knight Co., Worcester, Mass.
Resiscote—Enamels and lacquers. Reilly Tar & Chemical Corp., Indianapolis, Ind.
Reliance—Leather belting. Chicago Belting Co., Chicago, Ill.
Resistive—Insulation. Infra Insulation, Inc., New York, N. Y.
Revolute—Blueprint machines. Paragon-Revolute Corp., Rochester, N. Y.
Revolving—Heaters. Wing Mfg. Co., L. J., New York, N. Y.
Revolving—Ventilators. Burt Mfg. Co., Akron, O.
Rex—Chain drives, coal and ash conveyors, couplings, nozzles, bearings, pumps. Chain Belt Co., Milwaukee, Wis.
Rex—Fans, ventilators, wheels. Air Controls, Inc., Div. of Cleveland Heater Co., Cleveland, O.
Rexarc—Electrodes. Sight Feed Generator Co., West Alexandria, O.
Rex-Flex—Ducts, hose. Flexonics Corp., Maywood, Ill.
Rexoil—Burners, heaters. Reif-Rexoil, Inc., Buffalo, N. Y.
Rex-Tube—Duct connections, duct fittings, hose. Flexonics Corp., Maywood, Ill.
Rexvane—Fans. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Rex-Weld—Hose, ducts, duct connections. Flexonics Corp., Maywood, Ill.
Rhinamel—Enamels and lacquers. Tropical Paint & Oil Co., Cleveland, O.
Ridgevent—Roof ventilators. Octagon Ventilator Co., Chicago, Ill.
Ridgid—Pipe machines, wrenches, cutters, chasers, reamers, vises. Ridge Tool Co., Elyria, O.
Rid-Sludge—Cleaning compounds, corrosion treatment. Apex All Weather Products, Chicago, Ill.
Rifco—Unions. Rhode Island Fittings Co., Hillsgrove, R. I.
Riflex—Vibration absorbers. United Metal Hose Co., Inc., Long Island City, N. Y.
Rigidon—Pipe. Heil Process Equipment Corp., Cleveland, O.
Rigid-Tex—Metals. Rigidized Metals Corp., Buffalo, N. Y.
Rihco—Humidifiers. Rhode Island Humidifier & Ventilating Co., Boston, Mass.
Rincontrol—Enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Rip-pl—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Ripple-Fin—Cooling and heating surface. McQuay, Inc., Minneapolis, Minn.
Risselt—Air valves, air eliminators. Moreheat Distribution, Inc., Cincinnati, O.
Robinson—Brakes, punches. New Albany Machine Mfg. Co., New Albany, Ind.
Robot—Switches, thermostats. Miller-Harris Instrument Co., Milwaukee, Wis.
Robot-Eye—Regulators, smoke alarms. General Power Plant Corp., Ossining, N. Y.
Rockwell—Bast gates. Thermix Corp., The, Greenwich, Conn.
Rocop—Heaters. Rome-Turney Radiator Co., Rome, N. Y.
Rodpax—Packing. National Engineering Products, Inc., Washington, D. C.
Ro-Flo—Compressors, pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Rolagrip—Couplings. Gustin-Bacon Mfg. Co., Kansas City, Mo.
Rol-Air—Tools. Imperial Brass Mfg. Co., Chicago, Ill.
Roll-a-Bend—Pipe benders. Radiant Devices, St. Louis, Mo.
Rollway—Pumps. Pioneer Pump & Mfg. Co., Detroit, Mich.
Roofvane—Ventilators. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Ross—Pipe joints. Webster & Co., Warren, Camden, N. J.
Rosslyn Metal—Sheets. American Cladmetals Co., Carnegie, Pa.
Rotameter—Flow meters. Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Roto Blast—Furnaces. Moncrief Furnace Co., Atlanta, Ga.
Roto-Clone—Dust collectors. American Air Filter Co., Inc., Louisville, Ky.
Rotojet—Spray nozzles. Binks Mfg. Co., Chicago, Ill.
Roto-louvre—Dryers. Link-Belt Co., Chicago, Ill.
Rotomet—Solder and fluxes. Rotometals, Inc., San Francisco, Calif.
Rotometric—Solder and fluxes. Rotometals, Inc., San Francisco, Calif.
Roto-Torq—Tools. Richmont, Inc., San Gabriel, Calif.
Roto-trol—Liquid pressure regulators, indicators, and switches. Healy Ruff Co., St. Paul, Minn.
Rotre—Vacuum pumps. Wheeler Mfg. Co., C. H., Philadelphia, Pa.
Ro-Twin—Air compressors, pumps. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Royal—Packing. United States Rubber Co., New York, N. Y.
Roxaprene—Protective coatings, enamels and lacquers. Interchemical Corp., Finishes Div., Newark, N. J.
Roxco—Wrenches. Trimont Mfg. Co., Roxbury, Mass.
Roxite—Pipe. United States Stoneware Co., New York, N. Y.
Roxyn C—Enamels and lacquers, protective coatings. Interchemical Corp., Finishes Div., Newark, N. J.
Royal—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Royal Clipper—Cutters and shears. M-M-A, Inc., Lancaster, Pa.
Rubalt—Enamels and lacquers, protective coating. Hague & Co., Alfred, Brookyn, N. Y.
Rubatex—Insulation. Virginia Rubatex Div., Great American Industries, Inc., Bedford, Va.
Rubyfluid—Solder. Ruby Chemical Co., Columbus, O.
Rusco—Insulation. Russell Co., F. C., The, Cleveland, O.
Rust Bloc No. 20—Coatings. Turco Products, Inc., Los Angeles, Calif.
Rustbuster—Cleaning compounds. Cannon Chemical Co., Inc., Cambridge, Mass.
Rust Evade—Coatings. Turco Products, Inc., Los Angeles, Calif.
Rust Raider—Compounds. Radiator Specialty Co., Charlotte, N. C.
Rust Veto—Protective Coatings. E. F. Houghton & Co., Philadelphia, Pa.

S-A—Conveyors, feeders. Stephens-Adamson Mfg. Co., Aurora, Ill.
SA—Valves. Lunkenheimer Co., Cincinnati, O.
S. C.—Air heaters, gas burners, recorders. Surface Combustion Corp., Toledo, O.
S.F.E.—Insulation. Standard Fuel Engineering Co., Detroit, Mich.
S-N—Air conditioning units, burners, fans, heaters, pumps, stokers. Scott-Newcomb, Inc., St. Louis, Mo.
S & P—Burners, governors, preheaters, regulators, strainers, fuel oil units, valves. Staples & Pfeiffer, San Francisco, Calif.
S. R. P.—Protective coatings. Sonneborn Sons, Inc., L., New York, N. Y.
SS Unit—Pumps. Allis-Chalmers Mfg. Co.,

Milwaukee, Wis.
Sanbanol—Fuel oil treatment. American Sand-Banum Co., Inc., New York, N. Y.
Saco—Speed reducers. Stephens-Adamson Mfg. Co., Aurora, Ill.
Saf Dry—Refrigerants. Liquid Carbonic Corp., The, Chicago, Ill.
Safe-Flo—Heaters. Duffy Engrg. Co., Portland, Ore.
Safe-T-Aire—Air sterilizing units. Hanovia Chemical & Mfg. Co., Newark, N. J.
Safe Guard—Fuel oil preheaters. Alstrom Corp., Bronx, N. Y.
Safety—Heaters. Wing Mfg. Co., L. J., New York, N. Y.
Safety-Circle—Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Saftrol—Controls. Penn Controls, Inc., Goshen, Ind.
Sahara—Dehumidifiers. Niagara Industrial Corp., New York, N. Y.
Saint Louis—Stokers. Ormsby-Osterman, Inc., St. Louis, Mo.
Sairset—Cement. Green Fire Brick Co., Mexico, Mo.
Sal-Mo—Cement, insulation, packing. Sall Mountain Co., Hamilton, O.
Sanidaire—Humidifiers. United States Air Conditioning Corp., Minneapolis, Minn.
Santobrite—Water treatment. Monsanto Chemical Co., St. Louis, Mo.
Santocel—Insulation. Monsanto Chemical Co., Merimac Div., Boston, Mass.
Santosite—Water treatment. Monsanto Chemical Co., St. Louis, Mo.
Santrol—Registers. Tuttle & Bailey, Inc., New Britain, Conn.
Sarancote—Protective coatings. Saran Lined Pipe Co., Ferndale, Mich.
Satincote—Insulation, building. Insulite Div., Minnesota and Ontario Paper Co., Minneapolis, Minn.
Saunders—Pipe cutters. Erie Tool Works, Erie, Pa.
Saunders—Diaphragm valves. Grinnell Co., Inc., Providence, R. I.
Scaico—Thermostats. Smith Control & Instrument Corp., Palmyra, N. J.
Scentinel—Compounds. Ampion Corp., Long Island City, N. Y.
Schmidt—Torches. Minn-Kota Foundry & Mfg. Co., Fargo, N. D.
Schrammine—Aftercoolers. Schramm, Inc., West Chester, Pa.
Schwan—Propeller pumps. Haertel Co., Walter, Minneapolis, Minn.
Schwan—Gas burners. Jamieson Mfg. Co., Dallas, Texas.
Scoggins—Shears and snips. Pacific Machine & Iron Wks., Tacoma, Wash.
Scotch—Adhesive tape. Minnesota Mining & Mfg. Co., St. Paul, Minn.
Scottie Jr.—Boilers. Kewanee-Ross Corp., Kewanee, Ill.
Scout—Water heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Screw-Seal—Pipe. Robinson Clay Product Co., Inc., The, Akron, O.
Scroll-Aire—Air heaters. Newcomb-Detroit Co., Detroit, Mich.
Scruin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Scru-peller—Sewage ejectors and pumps. Chicago Pump Co., Chicago, Ill.
Scru-Tite—Expansion Bolts. Master Craft Products, Jamaica, N. Y.
Sea Lion—Leather belting. Chicago Belting Co., Chicago, Ill.
Sea Rings—Asbestos packing. Johns-Manville, New York, N. Y.
Seal-Clad—Motors. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Sealeak—Compounds. Ampion Corp., Long Island City, N. Y.
Sealed Life—V-Belts. Dodge Mfg. Corp., Mishawaka, Ind.
Sealfas—Adhesives. Foster Co., Benjamin, Philadelphia, Pa.
Seal Master—Bearings. Stephens-Adamson Mfg. Co., Aurora, Ill.
Sealmore—Cement and compounds. Armite Laboratories, Los Angeles, Calif.
Seal-Rite—Cement and compounds. Macksons Co., New York, N. Y.
Seasonmaker—Air conditioning units. McQuay, Inc., Minneapolis, Minn.
Seismo-Dampers—Bases. Korfund Co., Inc., Long Island City, N. Y.
Selectair—Air conditioning units. Johnson Co., S. T., Philadelphia, Pa.
Selectric—Electric heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Selectrol—Regulators. Automatic Control Co., St. Paul, Minn.
Sells—Bearings. Roversford Foundry & Machine Co., Roversford, Pa.
Sensatherm—Thermostats. Mercoid Corp., Chicago, Ill.
Sensitrol—Relays. Weston Electrical Instrument Corp., Newark, N. J.
Sentinel—Pumps. Red Jacket Mfg. Co., Davenport, Ia.
Sentry—Alarms, and smoke recorders. Edwards, L. V., Rockville Center, N. Y.
Sentry—Draft controls, draft regulators. Krueger Sentry Gauge Co., Green Bay, Wis.
Sentry—Heaters. Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Sep-return—Separators. Wabash Mfg. Co., Chicago, Ill.
Sequestrene—Water softeners. Alrose Chemical Co., Providence, R. I.
Serval—Gaskets. Chicago Gasket Co., Chicago, Ill.
Service—Packing. Johns-Manville, New York, N. Y.
Servicecoat—Enamels and lacquers. Debevoise Co., The, Brooklyn, N. Y.
Sesure—Gages. Yarnall-Waring Co., Philadelphia, Pa.
Sette—Filter. Marquart Mfg. Co., Oakland, Calif.
"77"—Pipe coverings. Eagle-Picher Co., Cincinnati, O.
Shafconaire—Unit heaters. OverHead Heaters, Inc., Detroit, Mich.
Shawco—Bends, headers. Shaw Co., Benjamin F., Wilmington, Del.
Shelby—Tubing. National Tube Div., United States Steel Co., Pittsburgh, Pa.
Shield-Arc—Electrodes, arc welders. Lincoln Electric Co., Cleveland, O.
Shockmounts—Bases and pads. Lord Mfg. Co., Erie, Pa.
Shone—Sewage ejectors. Yeomans Bros. Co., Melrose Park, Ill.
Shuntflo—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Shur-Seal—Cement. Chicago Specialty Mfg. Co., Chicago, Ill.
Shutlbrak—Switches. Adam Electric Co., Frank, St. Louis, Mo.
Shut O Vent—Louvers and shutters. Reed Unit Fans, Inc., New Orleans, La.
Signico—Pilot and signal lights. Signal Injector Co., Brooklyn, N. Y.
Silastic—Packing. Dow Corning Corp., Midland, Mich.
Silastic—Industrial adhesive tape. Irvington Varnish & Insulator Co., Irvington, N. J.
Silbraz—Fittings. Walworth Co., New York, N. Y.
Silence Service—Noise elimination. Industrial Sound Control, Inc., Hartford, Conn.
Silent Auburn—Burners, heaters, air conditioning units. Auburn Burner Co., Auburn, Ind.
Silentblu—Gas burners. Beck Engineering Combustion Kompany, St. Louis, Mo.
Silent Korth—Burners. Eckhart Mfg. Co., Inc., Union, N. J.
Silentvane—Fans. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Sil-Fos—Solder. Handy & Harman, New York, N. Y.
Silicone—Protective coatings. Dow Corning Corp., Midland, Mich.
Silimite—Water treatment. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Sillimanite—Refractories and refractory cement. Taylor Sons Co., Charles, Cincinnati.
Siltube—Solder. All State Welding Alloys Co., Inc., White Plains, N. Y.
Silver Comet—Coatings. Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Silver Steel—Cutters. Atkins Saw Div., Borg-Warner Corp., Indianapolis, Ind.
Silverstreak—Chain drive. Link-Belt Co., Indianapolis, Ind.
Silver Stream—Spray nozzles. Skinner Irrigation Co., Troy, O.
Silvertop—Eliminators, traps. Anderson Co., V. D., The, Cleveland, O.
Simplex—Gages. Viking Pump Co., Cedar Falls, Ia.
Simplex—Regulators. Bell & Gossett Co., Morton Grove, Ill.
Simplex—Wrenches. Lowell Wrench Co., Worcester, Mass.
Sim-Trol—Controls. Simplex Mfg. Co., Fond du Lac, Wis.
Single-Flow—Cooling towers. Marley Co., Inc., The, Kansas City, Mo.
Sioux—Electric drills. Albertson & Co., Inc., Sioux City, Ia.
Sirocco—Blowers, fans. American Blower Corp., Detroit, Mich.
Skelly—Stokers. Combustion Engineering-Super Heater, Inc., New York, N. Y.
Skilbeck—Humidifiers. Techtmann Industries, Inc., Milwaukee, Wis.
Skip-Tooth—Dies. Nye Tool Co., Chicago, Ill.
Sky-Blast—Roof fan ventilators. Propellair Div., Robbins & Myers Inc., Springfield, O.
Slender—Direct radiation. Dunkirk Radiator Corp., Dunkirk, N. Y.
Slo-Speed—Reducers. Sterling Electric Motors, Inc., Los Angeles, Calif.
Sludgout—Fuel oil treatment. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Slugin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Smith-Dolan—Electric preheaters and stress relievers. Electric Arc, Inc., Newark, N. J.
Smith-Mills—Boilers. Smith Co., Inc., H. B., Westfield, Mass.
Smithway—Motors. Smith Corp., A. O., Eastern Motor Div., Dayton, O.
Smoothcote—Insulation, building. Insulite Div., Minnesota & Ontario Paper Co., Minneapolis, Minn.
Snapin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Snap-Rite—Ducts and duct fittings. Gray Metal Products, Inc., Rochester, N. Y.
Sno-Breze—Air conditioning units. Palmer Mfg. Corp., Phoenix, Ariz.
Snug—Radiation. Weil-McLain Co., Michigan City, Ind.
Softweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Solair—Air conditioning units. Northwest Heating, Inc., Portland, Ore.
Solray—Radiation. Weil-McLain Co., Michigan City, Ind.
Sol-vet—Cleaning compounds, water treatment. Anderson-Stolz Corp., Kansas City, Mo.
Sonoairduct—Ducts. Sonoco Products Co., Hartsville, S.C.
Sono-O-Seal—Insulation. General Insulating Products Co., Brooklyn, N. Y.
So-Salts—Solder. Turco Products, Inc., Los Angeles, Calif.
Soundliner—Insulation. Baldwin-Hill Co., Trenton, N. J.
Sound Metal—Noise elimination. Industrial Sound Control, Inc., Hartford, Conn.
Sound Stream—Insulation. Industrial Sound Control, Inc., Hartford, Conn.
Sound-Zorbers—Vibration absorbers. Finn & Co., Inc., T. R., New York, N. Y.
South Wind—Heaters. Stewart-Warner Corp., Heating Div., Indianapolis, Ind.
Sovabead—Dehumidifiers. Socony-Vacuum Oil Co., Inc., New York, N. Y.
Sovereign—Packing. Darcoid Co., Inc., New York, N. Y.
Space Saver—Heaters. Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Spasaver—Cooler units. Drayer-Hanson, Inc., Los Angeles, Calif.
Spartan—Packing, belting. Graton & Knight Co., Worcester, Mass.
Spearhead—Gasket cutters. Zimmerman Packing Co., Cincinnati, O.
Special X—Solder. Industrial Service Laboratories, Milwaukee, Wis.
Speed Clamps—Hose clamps. Tinnerman Products, Inc., Cleveland, O.
Speed Clips—Insulation fasteners. Tinnerman Products, Inc., Cleveland, O.
Spee-Dee—Blue print and white print machines. Peck & Harvey, Chicago, Ill.
Speed Heater—Unit heaters. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.
Speed Nuts—Locknuts. Tinnerman Products, Inc., Cleveland, O.
Speedomax—Indicator and recorder-controllers, recorders, thermometers. Leeds & Northrup Co., Philadelphia, Pa.
Speed Prime—Pumps. Chain Belt Co., Milwaukee, Wis.
Speed-Trol—Changers. Sterling Electric Motors, Inc., Los Angeles, Calif.
Speedweld—Electrodes. Trindl Products, Ltd., Chicago, Ill.
Speedy—Clamps, cutters, extractors, packing, tools. Chicago Specialty Mfg. Co., Chicago, Ill.
Speedylectric—Generators, heaters. Livingstone Engineering Co., Worcester, Mass.
Speedyvent—Air eliminators. Livingstone Engineering Co., Worcester, Mass.
Spekaluminite—Coatings. Special Chemicals Corp., New York, N. Y.
Spekleen—Compounds. Special Chemicals Corp., New York, N. Y.
Sphero—Blow-off valves. Fairbanks Co., New York, N. Y.
Sphinx—Gas burners and water heaters. Bryant Corp., C. L., Cleveland, O.
Spinner—Gravity ventilators. Warner Ventilator Co., LaGrange, Ind.
Spinner—Ventilators. Inland Steel Products Co., Milwaukee, Wis.
Spiralock—Pulleys and sheaves. Scientiae Tool Co., Dayton, Ohio.
Spiratube—Ducts and duct fittings. Flexible Tubing Corp., Guilford, Conn.
Spiraweld—Pipes. Naylor Pipe Co., Chicago, Ill.
Spiro—Heaters. Stout & Sons, David, St. Louis, Mo.
Spirodome—Spray nozzles. Fluor Corp., Ltd., The Los Angeles, Calif.
Spiro-Jet—Gas burners. Thermapanels, Inc., San Jose, Calif.
Spirovane—Fans. Western Blower Co., Seattle, Wash.
Spongex—Bases and pads, gaskets, insulation. Sponge Rubber Products Co., The, Shelton, Conn.
Spotaire—Air conditioning units. Drayer-Hanson, Inc., Los Angeles, Calif.
Spraco—Booths, nozzles, separators, strainers, washers. Spray Engineering Co., Somerville, Mass.
Spra-Rite—Nozzles. Binks Mfg. Co., Chicago, Ill.
Spray-Acoustic—Insulation. Sprayo Flake Co., Chicago, Ill.

Spraywheel—Air washers. Mountain States Equipment Co., Denver, Colo.
Springin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Square-Heat—Boilers. Kewanee-Ross Corp., Kewanee, Ill.
Stabilflo—Valves. Foxboro Co., Foxboro, Mass.
Stack-Head—Dampers. Air Control Products, Inc., Coopersville, Mich.
Stainlend—Electrodes. Arcos Corp., Philadelphia, Pa.
Stainweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Standard—Ventilators. Burt Mfg. Co., Akron.
Standardaire—High pressure blowers. Read Standard Corp., Blower-Stoker Div., Erie, Pa.
Standforated—Grilles. Standard Stamping & Perforating Co., Chicago, Ill.
Starbird—Pressure and vacuum switches. Meletron Corp., Los Angeles, Calif.
Star-O-Zone—Ozone apparatus. Norwood Associated Engineers Inc., Springfield, Mass.
Star-Quality—Nipples. Star Tubular Products Co., Chicago, Ill.
Statick—Ventilators. Hirschman-Pohle Co., Inc., Le Roy, N. Y.
Stauffer—Clamps. Adams Pipe Repair Products, El Monte, Calif.
Staxauster—Roof ventilators. Allen Ventilator Div., Production Planning Co., Rochester, Mich.
Staynew—Filters. Dollinger Corp., Rochester, N. Y.
Stazin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Steamheat—Heating systems, valves. Radiator Valve Co. of America, Philadelphia, Pa.
Steam-Pak—Steam generator unit, heaters. York-Shipley, Inc., York, Pa.
Steelbestos—Metal sheets. American Steel Band Co., Pittsburgh, Pa.
Steen—Cutters, pipe cleaning machines. Continental Machine Co., Chicago, Ill.
Sterilamp—Lamps. Westinghouse Electric Corp., Pittsburgh, Pa.
Sterlco—Controls, pumps, strainers, regulators, traps, valves. Sterling, Inc., Milwaukee.
Sterling—Compressors, condensers, valves, pipe coils. Reynolds Mfg. Co., Springfield, Mo.
Ster-O-Zone—Ozone apparatus. Norwood Associated Engineers, Inc., Springfield, Mass.
Stictite—Cement, insulation. Refractory & Insulation Corp., New York, N. Y.
Stillson—Wrenches. Walworth Co., New York, N. Y.
Stirling—Boilers. Babcock & Wilcox Co., New York, N. Y.
Stok-A-Fire—Stokers. Automatic Firing Corp., St. Louis, Mo.
Stokerator—Stokers. Northern Steel & Stoker Corp., Peoria, Ill.
Stokerelay—Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Stokol—Burners, stokers. Diamond Iron Works, Inc., Minneapolis, Minn.
Stonewall—Board and sheets. Ruberoid Co., New York, N. Y.
Storm Shade—Windows. Ingersoll Products Div., Borg-Warner Corp., Chicago, Ill.
Straitflo—Strainers. Hays Mfg. Co., Erie, Pa.
Streamjet—Spray nozzles. Spraying Systems Co. Bellwood, Ill.
Streamline—Couplings, cutters, fittings, heat exchangers, manifolds, nipples, pipe, strainers, tubing, unions, valves. Mueller Brass Co., Port Huron, Mich.
Streamliner—Registers. Auer Register Co., Cleveland, O.
Streamliner—Belting. New York Belting & Packing Co., Passaic, N. J.
Stronghold—Belting. Rhoads & Sons, J. E., Philadelphia, Pa.
Studin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Stud-Pak—Insulation. United States Mineral Wool Co., Stanhope, N. J.
Submersion—Boilers, water heaters. Stout & Sons, David, St. Louis, Mo.
Sullivan—Controls. Cole-Sewell Engineering Co., St. Paul, Minn.
Sunair—Heaters. Mission Appliance Corp., Hawthorne, Calif.
Sunrad—Direct radiation, hangers. American Radiator & Standard Sanitary Corp., Pittsburgh, Pa.
Super—Transformers. Union Spring & Mfg. Co., Jersey City, N. J.
Super Air Screws—Fans. Marathon Electric Mfg. Corp., Wausau, Wis.
Supercutno—Packing. Greene, Tweed & Co., North Wales, Pa.
Superector—Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Superex—Insulation. Johns-Manville, New York, N. Y.
Super-Felt—Insulation. Johns-Manville, New York, N. Y.
Superfin—Furnaces. American Foundry & Furnace Co., Bloomington, Ill.
Super-Fine—Insulation. Libbey-Owens-Ford Glass Co., Toledo, O.
Super Finish—Insulation. Refractory & Insulation Corp., New York, N. Y.
Superflo—Heaters. Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Superflux—Solder. Paul-Lewis Laboratories, Inc., Milwaukee, Wis.
Superheat—Gas burners. Selas Corp. of America, Philadelphia, Pa.
Superior—Fans. American Foundry & Furnace Co., Bloomington, Ill.
Superior—Gas fired heaters. Bastian-Morley Co., Inc., LaPorte, Ind.
Super-Power—Drives. Baldwin Belting, Inc., New York, N. Y.
Superratchet—Ratchet Wrenches. Williams & Co., J. H., Buffalo, N. Y.
Superrench—Tools. Williams & Co., J. H., Buffalo, N. Y.
Superseal—Fittings. Grinnell Co., Inc., Providence, R. I.
Super 7—V belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Super Silvertop—Traps. The V. D. Anderson Co., Cleveland, O.
Super "66"—Insulation. Eagle-Picher Co., Cincinnati, O.
Supersheat—Gaskets. Greene, Tweed & Co., North Wales, Pa.
Super T—Systems. Tork Clock Co., Mount Vernon, N. Y.
Supertan—Leather belting and v-belts. Baldwin Belting, Inc., New York, N. Y.
Supertemp—Insulation. Eagle-Picher Co., Cincinnati, O.
Supertherm—Heating systems. Ross Engineering Corp., J. O., New York, N. Y.
Super Thermo Stucco—Cement. Chicago Fire Brick Co., Chicago, Ill.
Super-Vacuum Vent—Roof ventilators. Octagon Ventilator Co., Chicago, Ill.
Super X—Sheets. Western Brass Mills, Metals Div. of Olin Industries, Inc., East Alton, Ill.
Super X—Coatings. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Sureclor—Feeders. Paddock Engineering Co., of Texas, Dallas, Tex.
Sure Return—Condensation return pumps. Chicago Pump Co., Chicago, Ill.
Sureweld—Electrodes, welders. National Cylinder Gas Co., Chicago, Ill.
Surfamax—Pipe line filters. Micro Metallic Corp., Glen Cove, N. Y.
Sutco—Motors. Sutton Corp., O. A., The, Wichita, Kan.
Sweatflow—Valves. Quality Specialty Co., Inc., Philadelphia, Pa.
Sylphon—Steam traps. Webster & Co., Warren, Camden, N. J.
Synchro—Valves. The Bristol Co., Waterbury, Conn.
Synchro-Lectric — Viscosimeters. Brookfield Engineering Laboratories, Inc., Stoughton, Mass.
Synchro-Meter—Meters. Bailey Meter Co., Cleveland, O.
Synchron—Motors. Hansen Mfg. Co., Inc., Princeton, Ind.
Synchro-Thermetron—Heating systems. Whittington Pump & Engineering Corp., Indianapolis, Ind.
Synchrotie—Recorders. Westinghouse Electric Corp., Pittsburgh, Pa.
Syncretizer—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.
Syncrogear—Speed reducers. U. S. Electrical Motors, Inc., Los Angeles, Calif.
Syndolag—Refractories and refractory cement. Basic Refractories, Inc., Cleveland, O.
Syphonaire—Ventilators. Western Engineering & Mfg. Co., Venice, Calif.

T. N.—Valves. Imperial Brass Mfg. Co., Chicago, Ill.
T. T.—Smoke guns. Hill, E. Vernon & Co., Chicago, Ill.
Tabasco—Water heaters. Kewanee-Ross Corp., Kewanee, Ill.
Tag—Hygrometers, gages, indicator-controllers, operators, psychrometers, recorders, regulators, thermometers, valves. Tagliabue Instruments Div. Weston Electrical Instrument Corp., Newark, N. J.
Tampin—Bolts. Star Expansion Bolt Co., New York, N. Y.
Tanco—Insulation, duct, sound deadening. Thompson & Co., Oakmont, Pa.
Tank Kleen—Fuel oil treatment. Celco Corp., New York, N. Y.
Tank-O-Meter—Gages, indicators. Uehling Instrument Co., Paterson, N. J.
Tanktrol—Regulators, sprinkler systems controls. Automatic Control Co., St. Paul.
Tannate—Belting, packing. Rhoads & Sons, Sons, J. E., Philadelphia, Pa.
Tannate-Rockwood—Belt drives. Rhoads & Sons, J. E., Philadelphia, Pa.
Taper-Lock—Couplings, V-belt drives. Dodge Mfg. Corp., Mishawaka, Ind.
Tasil—Furnace cement. Taylor Sons Co., Charles, Cincinnati, O.
Tayco—Furnace and refractory cement, refractories. Taylor Sons Co., Charles, Cincinnati, O.
Teel—Pumps. Dayton Electric Mfg. Co., Chicago, Ill.
TEG—Humidifiers, sterilizing units. National Air Conditioning Inc., Johnstown, Pa.
Teksag Colloid—Boiler cleaning compounds. Agnew & Tomlinson, Long Island City, N. Y.
Tektor—Switches. Fielden Instrument Div., Robertshaw-Fulton Controls Co., Philadelphia, Pa.
Tel-A-Pipe—Identification markers for piping. Western Lithograph Co., Los Angeles, Calif.
Telecator—Gages, recorders and recorder-controllers. Automatic Control Co., St. Paul, Minn.
Telemaster—Relays. Tork Clock Co., Inc., Mt. Vernon, N. Y.
Tellevel—Switches. Stephens-Adamson Mfg. Co., Aurora, Ill.
Tellite—Alarms. Rochester Mfg. Co., Inc., Rochester, N. Y.
Teltru—Anemometers, gages. Hill, E. Vernon & Co., Chicago, Ill.
Tem-Clock (Electric)—Time switches. Penn Controls, Inc., Goshen, Ind.
Temflex—Plastic tubing. Irvington Varnish & Insulator Co., Irvington, N. J.
Temploc—Insulation. Armstrong Cork Co., Lancaster, Pa.
Tempmaster—Thermostats. Crown Controls Co., Inc., New Bremen, O.
Tempoint—Thermometers. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Temproof—Bases and pads. Lord Mfg. Co., Erie, Pa.
Tempscribe—Recorders. Bacharach Industrial Instrument Co., Pittsburgh, Pa.
Temptrol—Insulation. Badham Insulation Co., Inc., Birmingham, Ala.
Tensulate—Insulation. Tennessee Products and Chemical Corp., Nashville, Tenn.
Tergitol—Water treatment. Carbide and Carbon Chemicals Co., A Division of Union Carbide and Carbon Corp., New York, N. Y.
Terra Therm—Air conditioning units. Webber Engineering Corp., Indianapolis, Ind.
Testite—Fittings. General Fittings Co., Providence, R. I.
Texdrive—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texiron—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texrope—V-belt drives, pulleys, v-belts. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texslide—Motor bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texsteel—Pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Texolite—Tubing, General Electric Co., Chemical Dept., Pittsfield, Mass.
Texway—Bases. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Tharco—Cement. The Armstrong Co., Detroit.
Thawzone—Dehydrant and acid neutralizer. Highside Chemicals Co., Clifton, N. J.
Therma-Kit—Coils and panels. Thermapanels, Inc., San Jose, Calif.
Therma-Koil—Tubing. Thermapanels, Inc., San Jose, Calif.
Thermalbridge—Thermometers. Thompson Research & Mfg. Co., Davenport, Fla.
Thermal Electric—Heaters, pipe, preheaters, systems, transformers. Fluid Systems, Inc., New Haven, Conn.
Thermalfin—Unit coolers. Thermal Co., Inc., Milwaukee, Wis.
Thermalite—High temperature paint. Tropical Paint & Oil Co., Cleveland, O.
Thermatrol—Valves. Schnacke, Inc., Evansville, Ind.
Thermatube—Pre-insulated pipe. Flexible Tubing Corp., Guilford, Conn.
Thermidaire—Furnaces, heaters. Campbell Heating Co., E. K., Kansas City, Mo.
Thermo—Expansion valves. Alco Valve Co., St. Louis, Mo.
Thermo—Heaters. American Furnace Co., St. Louis, Mo.
Thermobank—Systems. Kramer Trenton Co., Trenton, N. J.
Thermobloc—Air heaters. Prat-Daniel Corp., East Port Chester, Conn.
Thermochek—Controls. Bell & Gossett Co., Morton Grove, Ill.
Thermo-Draulik—Operators, regulators. Perfex Corp., Milwaukee, Wis.
Thermodrive—Speedchangers, pulleys and sheaves. Webster Electric Co., Racine, Wis.
Thermodulor—Control systems. Carvell Heat Equipment Co., Los Angeles, Calif.
Thermoflex—Strainers, heating systems, radiator orifices, traps, valves. Cashin Co., W. D., Boston, Mass.
Thermoflex—Radiator orifices. Grinnell Co., Inc., Providence, R. I.
Thermofuel—Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermogas—Furnaces. Beck Engineering Combustion Kompany, St. Louis, Mo.
Thermo Grip—Torches. Ideal Industries, Inc., Sycamore, Ill.
Thermoguide—Thermometers. Taylor Instrument Companies, Rochester, N. Y.
Thermo-Humidigraph — Recorder-controllers. Bristol Co., The, Waterbury, Conn.
Thermoil—Furnaces, unit heaters. Beck Engineering Combustion Kompany, St. Louis.
Thermoilgas—Gas and oil burners. Beck

Engineering Combustion Kompany, St. Louis, Mo.

Thermoil-Granodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.

Thermolator—Valves. Triplex Heating Specialty Co., Inc., Peru, Ind.

Thermolier—Unit heaters. Grinnell Co., Inc., Providence, R. I.

Thermopane—Windows. Libbey-Owens-Ford Glass Co., Toledo, O.

Thermoswitch—Thermostats, regulators. Fenwal, Inc., Ashland, Mass.

Therm-o-tile—Conduit. Porter & Co., Inc., H. W., Newark, N. J.

Therm-otrols—Thermometers. Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.

Thermovent—Unit ventilators. Nesbitt, Inc., John J., Philadelphia, Pa.

Thermovoir—Water heaters. Bell & Gossett Co., Morton Grove, Ill.

Thermwire—Conductors and Panels. Wiegand Co., Edwin L., Pittsburgh, Pa.

Thin Man—Registers. Register & Grille Mfg Co., Inc., Brooklyn, N. Y.

Thor—Belting. Goodyear Tire & Rubber Co., Akron, O.

Thor—Drills, Hose clamps, pumps, reamers, shears, valve reseaters, weld grinders. Independent Pneumatic Tool Co., Aurora, Ill.

Thorobred—V belts and v belt drives. Dayton Rubber Co., Dayton, O.

Thread-Tite—Cement and compounds. Armite Laboratories, Los Angeles, Calif.

Thredolets—Fittings. Bonney Forge & Tool Wks., Allentown, Pa.

3C—Motor controls. Clark Controller Co., Cleveland, O.

3M—Cements and compounds, adhesives, insulation, packing. Minnesota Mining & Mfg. Co., St. Paul, Minn.

Thrift—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

Thriftymatic—Draft regulators. Engineered Products Co., Philadelphia, Pa.

Throway—Air filters. American Air Filter Co., Inc., Louisville, Ky.

Thur-Ma-Lox—Coatings. Dampney Co., The, Hyde Park, Boston, Mass.

Tico—Galvanized Sheet Steel. Inland Steel Products Co., Milwaukee, Wis.

Ticosteam—Boilers. Titusville Iron Works Co., The, Titusville, Pa.

Ticotherm—Boilers. Titusville Iron Works Co., The, Titusville, Pa.

Tilt Trap—Steam traps. Nason Co., Clarkston, Mich.

Timercoid—Time switches. Mercoid Corp., Chicago, Ill.

Timerelay — Relays. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Time-O-Stat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.

Tin-Ezy—Coatings, solder and fluxes. Johnson Mfg. Co., Inc., Mt. Vernon, Ia.

Tin-Loy—Solder. Eagle-Picher Co., Cincinnati, O.

Tiny—Traps. Nason Co., Clarkston, Mich.

Titan—Traps. Nason Co., Clarkston, Mich.

Tite Seal—Cement and compounds. Radiator Specialty Co., Charlotte, N. C.

Tom Thumb—Pipe machines. Oster Mfg. Co., Cleveland, O.

Toolweld—Electrodes. Lincoln Electric Co Cleveland, O.

Torchmaster—Torches. Industrial Engineered Products Co., Los Angeles, Calif.

Torchweld—Regulators, valves, welding and cutting apparatus. National Cylinder Gas Co., Chicago, Ill.

Torkflash—Wrenches. Blackhawk Mfg. Co., Milwaukee, Wis.

Tork Master—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

Torkotherm—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

Torpedo—Dehydrators, filters. Imperial Brass Mfg. Co., Chicago, Ill.

Torqometer—Torque indicating wrenches. Snap-on Tools Corp., Kenosha, Wis.

Torq-Stop—Wrenches. Richmont, Inc., San Gabriel, Calif.

Torque-Arm—Reducers. Dodge Mfg. Corp., Mishawaka, Ind.

Torrid—Torches. Polis Mfg. Co., J. D., Chicago, Ill.

Trace—Refrigerant leak detectors. Highside Chemicals Co., Clifton, N. J.

Tramrail—Conveyors. Cleveland Tramrail Div., Cleveland Crane & Eng. Co., Wickliffe, O.

Transaire—Transmitters. Taylor Instrument Companies, Rochester, N. Y.

Transflex—Plastic tubing. Irvington Varnish and Insulator Co., Irvington, N. J.

Transite—Conduit, pipe, ducts and duct fittings, refractories, sheets and board. Johns-Manville, New York, N. Y.

Transparent—Analyzers, gages, manometers. Dwyer Mfg. Co., F. W., Chicago, Ill.

Trap-Dri—Dehydrators. A-P Controls Corp., Milwaukee, Wis.

Trap-it—Filters. A-P Controls Corp., Milwaukee, Wis.

Tray—Cooling towers. New England Cooling Tower Co., Boston, Mass.

Treet-O-Control—Steam system and water treatment. % Proportioneers, Inc. %, Providence, R. I.

Treet-O-Unit—Feeders, pumps. % Proportioneers, Inc. %, Providence, R. I.

Triad—Stocks and dies. Nye Tool & Machine Co., Chicago, Ill.

Tri-Clad—Motors. General Electric Co., Apparatus Dept., Schenectady, N. Y.

Trident—Meters. Neptune Meter Co., New York, N. Y.

Tri-Flex—Registers, grilles. Tuttle & Bailey, Inc., New Britain, Conn.

Tri-Flux—Solder. Wolfe-Kote Co., Inc., Sheboygan, Wis.

Trimo—Cutters, tongs, vises, wrenches. Trimount Mfg. Co., Div. of Aetna Industrial Corp., Boston, Mass.

Trintherm—Thermostats. General Controls Co., Glendale, Calif.

Tri Guard—Protective coatings. Foster Co., Benjamin, Philadelphia, Pa.

Trin-Vue—Sight glasses. Trinity Equipment Corp., Roselle Park, New Jersey

Triple—Fittings. Parker Appliance Co., The Cleveland, O.

Triple-A—Enamels and lacquers, protective coatings. Quigley Co., Inc., New York, N. Y.

Triple Duty—Heating systems. Bell & Gossett Co., Morton Grove, Ill.

Triple-Seal—Fittings. Imperial Brass Mfg. Co., Chicago, Ill.

Triplex—Stocks and dies. Nye Tool Co., Chicago, Ill.

Tripl-Mix—Cement. Krehbiel Co., J. H., Chicago, Ill.

Tri-Rotor—Pumps. Yale & Towne Mfg. Co., Stamford, Conn.

Triumph—Gages and indicators. Boston Auto Gage Co., Pittsfield, Mass.

Trojan—Boilers. Burnham Corp., Boiler Div., Irvington, N. Y.

Trojan—Stokers. Auburn Burner Co., Auburn Ind.

Tropelite—Coatings. Tropical Paint & Oil Co., Cleveland, O.

Tropic-Aire Carrier—Air conditioning units. McGraw Electric Co., Clark Div., Chicago.

Tropic-Breeze—Air conditioning units. Dalzen Mfg. Co., St. Clair, Mich.

Tropilux—Enamels and lacquers. Tropical Paint & Oil Co., Cleveland, O.

Tru-Air—Air conditioning units. Blazer, M., & Son, Passaic, N. J.

Truespot—Testers. Bacharach Industrial Instrument Co., Pittsburgh, Pa.

Truflex—Bi-metals. General Plate Div., Metals & Controls Corp., Attleboro, Mass.

Truflex—Drives, V. Belt. Gates Rubber Co., The, Denver, Colo.

Truliradiant—Gas burners. Gordon & Piatt, Winfield, Kan.

Truliradiant—Gas burners. Sullivan Valve & Engineering Co., Butte, Mont.

Trumark—Protractor for marking pipe. Tru-Line Corp., Los Angeles, Calif.

Try-Me—Regulators, strainers, valves. Tryco Products, Inc., Westfield, Mass.

Tubecote—Protective coatings. Wilhelm Co., A., Reading, Pa.

Tubejet—Compressors, ejector type vacuum pump. Wheeler Mfg. Co., C. H., Philadelphia, Pa.

Tube-Tite—Pipe hangers and supports. Titchener, E. H. & Co., Binghamton, N. Y.

Tuff-Bond—Adhesives, cement. Moore Inc., Goodloe E., Danville, Ill.

Tufflex—Insulation. Wood Conversion Co., St. Paul, Minn.

Tuf-flex—Gage and sight glasses. Libbey-Owens-Ford Glass Co., Toledo, O.

Tuf-On—Protective coatings. Brooklyn Varnish Mfg. Co., Brooklyn, N. Y.

Tulox—Plastic pipe and tubing. Extruded Plastics, Inc., Norwalk, Conn.

Tumblin—Bolts. Star Expansion Bolt Co., New York, N. Y.

Tungweld—Electrodes. Lincoln Electric Co., The, Cleveland, O.

Turbine Driven—Heaters. Wing Mfg. Co., L. J., New York, N. Y.

Turblent-Aire—Overfire air jets. Canton Stoker Corp., Canton, O.

Turbo—Air washers, spray nozzles. Bayley Blower Co., Milwaukee, Wis.

Turbo-Flo—Water chillers. Drayer-Hanson, Inc., Los Angeles, Calif.

Turbo Vane—Fans and blowers. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

Turbulaire—Dryers. Western Precipitation Corp., Los Angeles, Calif.

Turret—Pumps. Yeomans Bros. Co., Melrose Park, Ill.

Tu-way—Radiation. Brown Products Co., Forest Hills, N. Y.

20th Century—Bearings. Roller Bearing Co., of America, Trenton, N. J.

Twin Contact—Controls, switches, thermostats. Perfex Corp., Milwaukee, Wis.

Twindow—Heat insulating windows. Pittsburgh Plate Glass Co., Pittsburgh, Pa.

Twin-Flow—Cooling towers. Marley Co., The, Kansas City, Mo.

Twin G-Fin—Preheaters. Griscom-Russell Co., The, New York, N. Y.

Twin-Line—Pumps. Cooper-Bessemer Corp., The, Mt. Vernon, O.

Twin Seal—Check valves, gage testers. Mansfield & Green, Cleveland, O.

2-in-1—Sealing compounds. Utility Laboratory, Inc., Brooklyn, N. Y.

Tygon—Protective coatings, plastic tubing. U. S. Stoneware Co., New York, N. Y.

Tylox—Pipe couplings. United States Stoneware Co., New York, N. Y.

Tymit—Switches. Tork Clock Co., Inc., Mt. Vernon, N. Y.

U. S. AirFlow—Radiation. United States Radiator Corp., Detroit, Mich.

U S—Fittings, flanges, tank plugs. U. S. Plug & Fitting Co., Wellington, O.

U. S.—Heaters. United States Radiator Corp., Detroit, Mich.

US-Capitol—Boilers, hangers or brackets, heaters, radiation. United States Radiator Corp., Detroit, Mich.

US-Capitolaire—Air conditioning units, furnaces. United States Radiator Corp., Detroit, Mich.

U. S. Fin Ray—Radiation. United States Radiator Corp., Detroit, Mich.

USG—Louvers and shutters. United States Gypsum Co., Chicago, Ill.

U. S. Lok-Fin—Radiation. United States Radiator Corp., Detroit, Mich.

U. S. Radiant Baseboard—Radiation. United States Radiator Corp., Detroit, Mich.

U. S. S.—Angles, sheets. United States Steel Co., Pittsburgh, Pa.

U. S. S.—Pipe, tubing. National Tube Div., United States Steel Co., Pittsburgh, Pa.

U-S-S—Sheets, angles. Columbia Steel Co., United States Steel Corp., Subsidiary, San Francisco, Calif.

USS—Sheets. Tennessee Coal, Iron & Railroad Co., United States Steel Corp. Subsidiary, Birmingham, Ala.

U. S. Solar Flame—Oil burners. United States Radiator Corp., Detroit, Mich.

U. S. Sunray—Radiation. United States Radiator Corp., Detroit, Mich.

Ucilon—Protective coatings, high temperature paint. United Chromium, Inc., New York, N. Y.

Ugasco—Gaskets. United States Gasket Co., Camden, N. J.

U-Loy—Sheets. Republic Steel Corp., Cleveland, O.

Ultrafine—Insulation. Gustin-Bacon Mfg. Co., Kansas City, Mo.

Ultralite—Insulation. Gustin-Bacon Mfg. Co., Kansas City, Mo.

Ultra-Viscoson—Viscosimeters. Rich-Roth Laboratories, East Hartford, Conn.

Unaflow—Steam engines. Ames Iron Works, Div. of Pierce Butler Radiator Corp., Oswego, N. Y.

Unarco—Insulation, gaskets, packing, Insulating cement. Union Asbestos & Rubber Co., Chicago, Ill.

Unbrako—Repair plugs, screws. Standard Pressed Steel Co., Jenkintown, Pa.

Unibestos—Insulation. Union Asbestos & Rubber Co., Chicago, Ill.

Unichrome—Enamels and lacquers, protective coatings. United Chromium Inc., New York.

Uniclosed—Electric motors. U. S. Electrical Motors, Inc., Los Angeles, Calif.

Unicoils—Air conditioning unit. Clarage Fan Co., Kalamazoo, Mich.

Unicon—Refrigerating condensers. Kramer Trenton Co., Trenton, N. J.

Uniduct—Ducts and duct fittings. General Corporation, Minneapolis, Minn.

Uni-fin—Grilles, registers. Barber-Colman Co., Rockford, Ill.

Uniflare—Fittings. Scovill Mfg. Co., Waterbury, Conn.

Uniflex—Metal hose. Brockway Co., Naugatuck, Conn.

Uni-flo—Dampers, diffusers, grilles, registers. Barber-Colman Co., Rockford, Ill.

Uniflow—Oil burners. Ace Engineering Co., Chicago, Ill.

Uniloy—Steel sheets. Universal-Cyclops Steel Corp., Bridgeville, Pa.

Unipack—Welding fume exhausters, centrifugal fans. American Machine Products Co., Marshalltown, Ia.

Uni-Pull—Flat belt drives. Rhoads & Sons, J. E., Philadelphia, Pa.

Unipump—Pumps. Weinman Pump Mfg. Co., Columbus, O.

Unishears—Electric shears. Stanley Electric Tools, Div. of The Stanley Works, New Britain, Conn.

Unisorb—Bases and pads. Felters Company, The, Boston, Mass.

Unitair—Air compressors. Joy Mfg. Co., Pittsburgh, Pa.

Unitaire—Air conditioning units. Westinghouse Electric Corp., Sturtevant Div., Boston, Mass.

Unitem—Heaters. Bell & Gossett Co., Morton Grove, Ill.

Unitherm—Unit heaters. Clarage Fan Co., Kalamazoo, Mich.

Unitite—Valves. Hanna Engineering Wks., Chicago, Ill.

UniTrane—Air conditioning units. Trane Co., The, La Crosse, Wis.
Universal—Benders. Hossfeld Mfg. Co., Winona, Minn.
Universal Burners. Dalzen Mfg. Co., St. Clair, Mich.
Universal—Cast iron pipe. Central Foundry Co., Newark, N. J.
Universal—Centrifugal pumps. Bell & Gossett Co., Morton Grove, Ill.
Universal—Gas and oil burners. Mettler Co., Inc., The, Los Angeles, Calif.
Universal—Packing. Johns-Manville, New York, N. Y.
Universal—Pipe cutters. Nye Tool Co., Chicago, Ill.
Universal—Regulators. Dockson Corp., Detroit, Mich.
Universal Unaflow—Engines. Skinner Engine Co., Erie, Pa.
Uni-Wash—Dust collectors. Newcomb-Detroit Co., Detroit, Mich.
Uno Turbine—Ventilators. Uno Ventilator Co., Malden, Mass.
Unxld—Regulators. Parker-Kalon Corp., New York, N. Y.
Upson—Bolts and studs. Republic Steel Corp., Bolt & Nut Div., Cleveland, O.
usAIRco—Air conditioning equipment, blowers, condensers, fans, grilles, heaters. United States Air Conditioning Corp., Minneapolis, Minn.
Uskon—Conductors. United States Rubber Co., New York, N. Y.
Utilitube.—Aluminum tubing. Aluminum Co. of America, Pittsburgh.
Utility—Blowers. American Blower Corp., Detroit, Mich.
Utility—Roof ventilators. Arex Co., Chicago.
Utility—Heaters. Wing Mfg. Co., L. J., New York, N. Y.

V*S—Changers. Reliance Electric & Engineering Co., Cleveland, O.
Vacumatic—Ejectors, pumps. Whittington Pump & Engineering Corp., Indianapolis.
Vacuumstat—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Vad—Cooling towers. Young Radiator Co., Racine, Wis.
Valcalox—Damper regulators. Young Regulator Co., Cleveland, O.
Valdura—Enamel. American-Marietta Co., Chicago, Ill.
Valvactor—Valve operators. Foxboro Co., Foxboro, Mass.
Valvent—Roof ventilators. Swartwout Co., Cleveland, O.
Valvrator—Valves. Fischer & Porter Co., Hatboro, Pa.
Vane-O-Line—Registers. Louvra Corp., The, Union, N. J.
Vape-Sorber—Filters. Selas Corp. of America, Philadelphia, Pa.
Vaporene—Corrosion inhibition. Metropolitan Refining Co., Inc., Long Island City, N. Y.
Vapor-Clarkson—Heating and process boilers. Vapor Heating Corp., Chicago, Ill.
Vaporstat—Switches. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Va-pur-izer—Room type unit humidifiers. Crowell & Dunn, Inc., New York, N. Y.
Varidrive—Speed changers. U. S. Electrical Motors, Inc., Los Angeles, Calif.
Varipitch—Pulleys and sheaves. Gates Rubber Co., The, Denver, Colo.
Vari-Pitch—Speed changers, pulleys and sheaves. Allis-Chalmers Mfg. Co., Milwaukee, Wis.
Vari-Vac—Heating systems. Dunham Co., C. A., Chicago, Ill.
Vari-Vent—Valves. Dole Valve Co., Chicago, Ill.
Vaultmaster—Air conditioning units. Haertel Co., Walter, Minneapolis, Minn.
Veco—Analyzers, combustion testing kits, Recorders, testers. Victory Engineering Corp., Union, N. J.
Veeco—Leak detectors. Vacuum Electronic Engineering Co., New Hyde Park, L. I., N. Y.
Vee Jet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Veelos—V belts. Manheim Mfg. & Belting Co., Manheim, Pa.
Velometer—Air velocity meters, anemometers. Illinois Testing Laboratories, Inc., Chicago, Ill.
Ventalarm—Alarms, gages. Scully Signal Co., Cambridge, Mass.
Ventfab—Connections, duct, flexible. Iden Associates, Chicago, Ill.
Ventglas—Connections, duct, flexible. Iden Associates, Chicago, Ill.
Vento—Traps. Haines & Co., Inc., William S., Div. Sellers Injector Corp., Philadelphia, Pa.
Vent-Rite—Air valves. Anderson Products, Inc., Cambridge, Mass.
Ventube—Ducts and duct fittings. E. I. du Pont de Nemours & Co., Inc., Fabrics & Finishes Dept., Wilmington, Del.
Ventura—Fans. American Blower Corp., Detroit, Mich.
Venturafin—Unit heaters. American Blower Corp., Detroit, Mich.
Venturi—Fan housings. Commercial Shearing & Stamping Co., Youngstown, O.
Venturi—Meters. Builders-Providence, Inc., Div. of Builders Iron Foundry, Providence, R. I.
Venturi-Flo—Air diffusers. Barber-Colman Co., Rockford, Ill.
Vent-Vac—Heating systems. Anderson Products, Inc., Cambridge, Mass.
Verco—Insulating cement. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Vercoustic—Insulation. Nelson Mfg. Co., B. F., Minneapolis, Minn.
Vermiculite—Insulation. International Vermiculite Co., Girard, Ill.
Vernier-Set—Time switches. Automatic Temperature Control Co., Inc., Philadelphia, Pa.
Versa-Liners—Blue and white print machines. Peck & Harvey, Chicago, Ill.
Vertical—Unit heaters. American Blower Corp., Detroit, Mich.
Vertiflow—Unit heaters. Young Radiator Co., Racine, Wis.
V-Flat—Pulleys and sheaves. Dayton Rubber Co., Dayton, O.
Vibracork—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Vibrasafe—Absorbers. Pleasantaire Corp., Washington, D. C.
Vibrashock—Bases and pads. Robinson Aviation, Inc., Vibrashock Div. Teterboro, N. J.
Vibra-sorber—Vibration absorbers. Flexonics Corp., Maywood, Ill.
Vibro-Bar—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Vibro-Hangers. Pipe hangers and supports. Korfund Co., Inc., Long Island City, N. Y.
Vibro Insulators—Bases. Goodrich Co., B. F., Akron, O.
Vibro-Isolator—Bases and pads. Korfund Co., Inc., Long Island City, N. Y.
Victor—Traps. Wright-Austin Co., Detroit.
Victory—Registers. Register & Grille Mfg. Co., Inc., Brooklyn, N. Y.
Vim—Gaskets, leather packing. Houghton & Co., E. F., Philadelphia, Pa.
Vim Tred—Leather belting. Houghton & Co., E. F., Philadelphia, Pa.
Vinsynite—Coatings. Thompson & Co., Oakmont, Pa.
Vinyl—Coatings. Gates Engineering Co., Wilmington, Del.
Visaflame—Controls. Mercoid Corp., The, Chicago, Ill.
Visco—Preheaters. Crotty Mfg. Corp., Long Island, N. Y.
Viscorator—Viscosimeters. Fischer & Porter Co., Hatboro, Pa.
Visi Flo—Sight glasses. O P W Corp., Cincinnati, O.
Visi—Float. Air filter gages. F. W. Dwyer Mfg. Co., Chicago.
Visoleak—Leak detectors. Allin Mfg. Co., Chicago, Ill.
Vistand—Vise stands. Armstrong Mfg. Co., Bridgeport, Conn.
Vitalloy—Wrenches. Billings & Spencer Co., Hartford, Conn.
Vitra-Carlite—Enamels and lacquers. Hilo Varnish Corp., Brooklyn, N. Y.
Vitreon—Pipe. Robinson Clay Product Co., Inc., The, Akron, O.
Vitricel—Refractories. Carey Mfg. Co., Philip, The, Lockland, Cincinnati, O.
Vitriram—Furnace cement. U. S. Stoneware Co., New York, N. Y.
Vix-Syn—Rubber and synthetic packing. Houghton & Co., E. F., Philadelphia, Pa.
V-Meth-L—Refrigerants. Virginia Smelting Co., West Norfolk, Va.
Voladjuster—Dampers, remotely operated volume control. Barber-Colman Co., Rockford, Ill.
Volcano—Ventilators. Iwan Brothers, South Bend, Ind.
Volcano—Torches. Industrial Engineered Products Co., Los Angeles, Calif.
Volocitrol—Louvers, regulators. Barber-Colman Co., Rockford, Ill.
Voriflow—Burners. Orr & Sembower, Inc., Reading, Pa.
Vornado—Fans, air conditioning units. Sutton Corp., O. A., The, Wichita, Kan.
Vortex—Pumps. Lawrence Pump & Engine Co., Lawrence, Mass.
Vortex—Nozzles. Phillips Cooling Tower Co., Inc., Brooklyn, N. Y.
V-to-V—Pulleys and sheaves. Dayton Rubber Co., Dayton, O.
Vulcalock—Fittings, pipe, tanks, valves. Goodrich Co., B. F., Akron, O.
Vulcan—Stands, tongs, vises. Williams & Co., J. H., Buffalo, N. Y.
Vulcan—Stokers. Canton Stoker Corp., Canton, O.
Vulcan-Hartford—Heating surface. Vulcan Radiator Co., Hartford, Conn.
Vulcan Superior—Tongs, vises. Williams & Co., J. H., Buffalo, N. Y.
Vulco—Belts, drives, pulleys. Gates Rubber Co., Denver, Colo.
Vulcomount—Pulleys. Gates Rubber Co., Denver, Colo.
Vynal—Coatings. Watson-Standard Co. Pittsburgh, Pa.
Vyncote—Coatings. Watson-Standard Co. Pittsburgh, Pa.
W. & McD.—Strainers. Watson & McDaniel Co., Philadelphia, Pa.
W-S—Fittings. Watson-Stillman Fittings Div., H. K. Porter Co., Inc., Roselle, N. J.
W & T—Anemometers, feeders, gages, indicators, hygrometers, dew point recorders, meters, relays. Wallace & Tiernan Co., Inc., Newark, N. J.
W & W—Pipe hangers. Western Wire Products Co., St Louis, Mo.
Wakefield—Fittings, pipe, pumps, tanks and valves. Lead Lined Iron Pipe Co., Wakefield, Mass.
Walco-Parmelee—Wrenches. Walworth Co., New York, N. Y.
Walltube—Radiator brackets. Arjac Products Inc., Rochester, N. Y.
Walseal—Fittings, valves. Walworth Co., New York, N. Y.
Walvector—Radiations. Webster & Co., Warren, Camden, N. J.
Warco—Combustion chambers, refractories. Walsh Refractories Corp., St. Louis, Mo.
Warco—Valves. Bridgeport Brass Co., Bridgeport, Conn.
Warco—Fuel oil treatment. Warren Refining & Chemical Co., The, Cleveland, O.
Warcolite—Enamels and lacquers. Warren Refining & Chemical Co., The, Cleveland, O
Warnock—Wrenches. Lowell Wrench Co., Worcester, Mass.
Wat-a-mat—Water meters. Pfening Co., Fred D., Columbus, O.
Watco—Cooling towers, humidifiers, spray nozzles, spraying systems. Water Cooling Corp., New York, N. Y.
Water Boy—Feeders, alarms, valves. Maid-O'-Mist, Inc., Chicago, Ill.
Water King—Pumps. Peerless Pump Div., Food Machinery and Chemical Corp., Los Angeles, Calif.
Water-Maker—Water heaters. Catskill Metal Works, Inc. Catskill, N. Y
Water-Mun—Heaters. Mund Boilers, Inc., Los Angeles, Calif.
Waterspar—Enamels and lacquers. Pittsburgh Plate Glass Co., Pittsburgh, Pa.
Wat-R-Miser—Condensers. Drayer-Hanson, Inc., Los Angeles, Calif.
Way Loctor—Doors and panels. Walsh, The, L. M. Co., Boston, Mass.
Wear-Proof—Pumps. Schneible Co., Claude B., Detroit, Mich.
Wearweld—Electrodes. Lincoln Electric Co., Cleveland, O.
Weather-Chron—Time switches. Automatic Devices Co., Inc., Western Springs, Ill.
Weather-Damper—Operators, regulators. Automatic Devices Co., Inc., Western Springs, Ill.
Weather-Flo—Thermostats, control systems. Automatic Devices Co., Inc., Western Springs, Ill.
Weathermaker—Unit air conditioners. Carrier Corp., Syracuse, N. Y.
Weathermaster—Unit air conditioners. Carrier Corp., Syracuse, N. Y.
Weather-Man—Regulators, switches, thermostats, control systems. Automatic Devices Co., Inc., Western Springs, Ill.
Weatherstat—Thermostats. Minneapolis-Honeywell Regulator Co., Minneapolis, Minn.
Webco—Brakes. Webb Machine & Tool Co., Imperial Pa.
Weber's—Forty-Eight Insulations, Inc., Aurora, Ill.
Webster Nesbitt—Unit heaters. Webster & Co., Warren, Camden, N. J.
Webster-Nesbitt "Little Giant"—Unit heaters. Nesbitt, Inc., John J., Philadelphia, Pa.
Weco—Plugs, steel unions. Chiksan Co., Brea, Calif.
Weco—Gas burners. Webster Engineering Co., Tulsa, Okla.
Wedgbelt—V belts and v-belt drives, pulleys. American Pulley Co., Philadelphia, Pa
Wee Scot—Boilers. Titusville Iron Works Co., The, Titusville, Pa.
Weir—Stokers. Meyer Furnace Co., The, Peoria, Ill.
Weiralead—Lead alloy coated sheets. Weirton Steel Co., Weirton, W. Va.
Weir-Meyer—Furnaces. Meyer Furnace Co., The, Peoria, Ill.
Weirzin—Electrolytic zinc coated sheets. Weirton Steel Co., Weirton, W. Va.
Weldaluminite—Welding compounds. Special Chemicals Corp., New York, N. Y.
Weldells—Welding fittings. Taylor Forge & Pipe Works Chicago, Ill.
Weld Ends—Couplings. Wachs Co., E. H., The, Chicago, Ill.
Weldolets—Fittings. Bonney Forge & Tool Works, Allentown, Pa.
WesCo—Solenoids. West Coast Electric Mfg. Co. Los Angeles, Calif.
Western—Fans, furnaces, heaters. International Sales Co., San Francisco, Calif.
Westernaire—Fans. Western Engineering & Mfg. Co., Venice, Calif.
Western Rotary—Ventilators. Western Engineering & Mfg. Co., Venice, Calif.
Westo—Water treatment. Western Chemical Co., Kansas City, Mo.
Wheeler-Economy—Ejectors, pumps. Wheeler Mfg. Co., C. H., Philadelphia, Pa.

Whirlcone—Spray nozzles. Water Cooling Equipment Co., St. Louis, Mo.
Whirljet—Spray nozzles. Spraying Systems Co., Bellwood, Ill.
Whisper-Quiet—Heaters. Zink Co., John, Tulsa, Okla.
Whitson—Steam traps. Healy Ruff Co., St. Paul, Minn.
Wilco—Bi-metals. Wilson Co., H. A., The, Newark, N. J.
Wilco—Pipe cutting machines. Oster Mfg. Co., Cleveland, O.
Williams-Hager—Valves. Williams Gauge Co., The, Pittsburgh, Pa.
Wilmington—Air compressors. Electric Spray-it Co., The, Sheboygan, Wis.
Windial—Anemometers. Friez Instrument Div., Bendix Aviation Corp., Baltimore, Md.
Wind Master—Ventilators. Acme Equipment Co., Muskogee, Okla.
Wind-O-Cool—Fans. Belter Electric Mfg. Co., G. J., The, St. Louis, Mo.
Wind-O-Vent—Window ventilator and filter units. Reed Unit-Fans, Inc., New Orleans, La.
Wingfoil—Ventilators. Wing Mfg. Co., L. J., Linden, N. J.
Winkler—Burners, stokers. U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
Winter-Chaser—Air conditioning units, furnaces, heaters. Campbell Heating Co., Des Moines, Ia.
Wissco—Grilles. Wickwire Spencer Steel Div. of Colorado Fuel & Iron Corp., New York, N. Y.
Witch—Bolts, clamps, hangers, protectors. Carpenter & Paterson, Inc., East Boston, Mass.
Wolf-Linde—Compressors, condensers, fittings, valves. Dersch, Gesswein & Neuert, Inc., Chicago, Ill.
Wonder—Tubing benders. American Pipe Bending Machine Co., Inc., Poultney, Vt.
Wondaire—Heaters. Cox Mfg. Co., Ridgeville, Ind.
Wovenstone—Pipe insulation. Union Asbestos & Rubber Co., Cicero, Ill.
Wrap-On—Pipe insulation, electric cable. Gro-Quick Co., Chicago, Ill.

X-L—Gaskets, packing. Excelsior Leather Washer Co., Rockford, Ill.
Xacto—Meters. Bowser, Inc., Fort Wayne, Ind.
"X" Boilerliquid—Compounds. X Laboratories, Inc., New York, N. Y.
"X" Flush Rustoff—Boiler cleaning compounds. X Laboratories, Inc., New York, N. Y.
"X" Pipejoin—Cement and compounds. X Laboratories, Inc., New York, N. Y.
Xit—Ventilators. Iona Ventilator Co., Inc., Philadelphia, Pa.

Yager's—Solder. Benson Co., Inc., Alex R., Hudson, N. Y.
Yarway—Alarms, clamps, expansion joints, recorders, nozzles, strainers, traps, valves. Yarnall-Waring Co., Philadelphia, Pa.
Yellow-Jacket—Heating boilers. Burnham Corp., Boiler Div., Irvington, N. Y.
Yellow Jacket—Pre-insulated pipe. American Insulated Pipe Co., New York, N. Y.
Yoloy—Pipe, sheet, tubing. Youngstown Sheet & Tube Co., Youngstown, O.
Yorkaire—Unit air coolers. York Corp., York, Pa.
York-Power—Oil burners. York-Shipley, Inc., York, Pa.
Yulatrol—Fuel oil preheaters. Yula Water Heaters, Inc., New York, N. Y.

Zapon—Enamels and lacquers. Atlas Powder Co., North Chicago, Ill.
Z-Crete—Pipe insulation. Zonolite Co., Chicago, Ill.
Zephyrweld—Pipe fittings. Tri-Clover Machine Co., Kenosha, Wis.
Zero—Cement, refractories. Standard Fuel Engineering Co., Detroit, Mich.
Zerolite—Insulation. Johns-Manville, New York, N. Y.
Zig Zag—Heat exchangers. Stout & Sons, David, St. Louis, Mo.
Zinaloy—Zinc sheets. Matthiessen & Hegeler Zinc Co., La Salle, Ill.
Zincgrip—Sheets. Armco Steel Corp., Middletown, O.
Zincilate—Coatings. Industrial Metal Protectives, Inc., Dayton, O.
Zinc Soot—Soot destroyers. Tamms Industries, Inc., Chicago, Ill.
Zinodine—Protective coatings. American Chemical Paint Co., Ambler, Pa.
Zircon—Furnace and refractory cement, refractories. Taylor Sons Co., Charles, Cincinnati, O.
Zoneair—Payne Furnace Div., Affiliated Gas Equipment Inc., Monrovia, Calif.
Zone-Master—Heating systems. General Heaters & Regulators Co., Chicago, Ill.
Zone-Pac—Heating systems. Barber-Colman Co., Rockford, Ill.

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 3—MANUFACTURERS' ADDRESSES

A

A. & A. Register Co., 8327 Clinton Rd., Cleveland 9, O.
A-J Mfg. Co., 2119 Washington St., Kansas City 8, Mo.
A-P Controls Corp., 2460 N. 32nd St., Milwaukee 10, Wis.
Abart Gear & Machine Co., 4828-36 W. 16th St., Chicago 50, Ill.
Abbeon Supply Co., 179-15 Jamaica Ave., Jamaica, N. Y.
Abbott & Biddle Co., 2413-27 Federal St., Philadelphia 46, Pa.
Acadia Synthetic Products Div., Western Felt Works, 4115 Ogden Ave., Chicago, Ill.
Accurate Sheet Metal Mfg. Works, 2336-40 Milwaukee Ave., Chicago 47, Ill.
Ace Engineering Co., 1435 W. 15th St., Chicago 8, Ill.
Ace Instrument Co., Inc., 172 Pacific St., Brooklyn, N. Y.
Acer & Whedon, Inc., Medina, N. Y.
Acheson Mfg. Co., Braddock P. O., Rankin, Pa.
Acker Organization, Inc., W. M., 3167 Fulton Rd., Cleveland 9, O.
Ackermann Mfg. Co., Wheeling, W. Va.
Acme Asbestos Covering & Flooring Co., 236 N. Elizabeth St., Chicago 7, Ill.
Acme Electric Corp., Cuba, N. Y.
Acme Electric Welder Co., 2618 Fruitland Ave., Los Angeles 58, Calif.
Acme Equipment Co., 205-13 E. Broadway, Muskogee, Okla.
Acme Industries, Inc., Cor. Mechanic and Ganson Sts., Jackson, Mich.
Acme Mfg. Co., State Rd. below Rhawn St., Holmesburg, Philadelphia 36, Pa.
Acme Refining Co., The, W. 56th & W. & L. E. Ry., Cleveland, O.
Acme Steel Co., 2840 Archer Ave., Chicago 8, Ill.
Acme White Lead & Color Works, 8250 St. Aubin Ave., Detroit 11, Mich.
Acorn Refining Co., 8001 Franklin Ave., Cleveland, O.
Acragage Corp., Wampus Lane, Milford, Conn.
Acro Mfg. Co., The, 2040 E. Main St., Columbus, O.
Acro Welder Mfg. Co., 1825 W. St. Paul Ave., Milwaukee 3, Wis.
Acrow, Inc., 155 Washington St., Newark, N. J.
Adam Electric Co., Frank, 3650 Windsor St., St. Louis, Mo.
Adams Co., The, E. 4th St., P. O. Box 268, Dubuque, Ia.
Adams Co., Inc., R. P., 225-7 E. Park Dr., Buffalo 17, N. Y.
Adams Mfg. Co., 1530 St. Clair Ave., Cleveland 3, O.
Adams Pipe Repair Products, 2453 Merced Ave., P. O. Box 21, El Monte, Calif.
Adjustable Clamp Co., 417 N. Ashland Ave., Chicago 22, Ill.
Adelta Mfg. Co., Inc., 21 & Ellsworth, Philadelphia 46, Pa.
Advance Aluminum Castings Corp., 2742 W. 36th Pl., Chicago 32, Ill.
Advance Electric & Relay Co., 2435 N. Naomi St., Burbank, Calif.
Advance Fan & Blower Co., 3428 Bagley, Detroit, Mich.
Advance Pump Co., 2531 9th St., Berkeley, Calif.
Aerco Corp., 214 Lafayette Pl., Englewood, N. J.
Aero-Coupling Corp., 3015 Winona Ave., Burbank, Calif.
Aerofin Corp., 410 S. Geddes St., Syracuse 1, N. Y.
Aeroil Products Co., Inc., Wesley St., South Hackensack, N. J.
Aeromatic Propeller Dept., Koppers Co., Inc., Baltimore 3, Md.
Aeroquip Corp., 300 S. East Ave., Jackson, Mich.
Aerotec Corp., The, Greenwich, Conn.
Aerotrol Engineering Co., 4135 Brownsville Rd., Pittsburgh 27, Pa.
Aerovent Fan Co., Inc., 710 E. Ash St., Piqua, O.
Agaloy Tubing Co., Springfield, O.
Agava Products, Inc., 34 Exchange Pl., Jersey City 2, N. J.
Aget-Detroit Co., 613 First National Bank Bldg., Ann Arbor, Mich.
Agnew Electric Co., Milford, Mich.
Agnew & Tomlinson, 51-04 Vernon Blvd., Long Island City 1, N. Y.
Ahlberg Bearing Co., 3081 W. 47th St., Chicago 32, Ill.
Air-Aid Corp., 69 Tencan St., Boston, Mass.
Air Conditioning Engineering Co., 44 First St., Cambridge 41, Mass.
Air Conditioning Products Co., 2340 W. Lafayette Blvd., Detroit 16, Mich.
Air Control Products, Inc., Coopersville, Mich.
Air Controls, Inc., Div. of Cleveland Heater Co., 2310 Superior Ave., Cleveland 14, O.
Air Conversion Research Corp., 4107 N. Damen Ave., Chicago 18, Ill.
Aircraft Fitting Co., 1400 E. 30 St., Cleveland 14, O.
Air Devices, Inc., 17 E. 42nd St., New York 17, N. Y.
Air Equipment Co., 1713 W. Carroll Ave., Chicago 12, Ill.
Air Equipment Co., 2730 Zuni St., Denver, Colo.
Air Filter Corp., 108 N. Water St., Milwaukee 2, Wis.
Air-Line Engineering Co., 198 Wayne St., Mansfield, O.
Air Purification Service, Inc., 136 Liberty St., New York, N. Y.
Air Reduction Sales Co., Div. of Air Reduction Co., Inc., 60 E. 42nd St., New York 17, N. Y.
Air & Refrigeration Corp., 475 Fifth Ave., New York 17, N. Y.
Air Vent Corp., 403 E. 62nd St., New York, N. Y.
Aireactor Corp., 22 E. 40th St., New York 16, N. Y.
Aire-Foile Fan & Blower Co., 2909 Central Ave., Detroit 9, Mich.
Airetool Mfg. Co., S. Center St., Springfield, O.
Airgard Mfg. Co., 362 W. Erie St., Chicago 10, Ill.
Airjet Ventilator Co., 380 Plumosa Dr., Pasadena 10, Calif.
Airkem, Inc., 241 E. 44 St., New York 17, N. Y.
Airmaster Corp., 4317 Ravenswood Ave., Chicago 13, Ill.
Air-Maze Corp., 5200 Harvard Ave., Cleveland 5, O.
Air-O-Cel Co., 23622 Woodward Ave., Detroit 20, Mich.
Air-Stream Filter Corp., 2100 Washington Ave., St. Louis 3, Mo.
Airtherm Mfg. Co., 711 S. Spring Ave., St. Louis 10, Mo.
Airwasher Corp., Eaton Rapids, Mich.
Ajax Flexible Coupling Co., Westfield, N. Y.
Ajax Furnace Fitting Co., Div. of Cincinnati Sheet Metal & Roofing Co., 216-220 E. Front St., Cincinnati 2, O.
Akron Metallic Gasket Co., 155 N. Union, P. O. Box 911, Akron 9, O.
Alabama Pipe Co., Anniston, Ala.
Aladdin Heating Corp., 2272 San Pablo Ave., Oakland 12, Calif.
Albert Pipe Supply Co., Berry & N. 13th, Brooklyn, N. Y.
Albertson & Co., Inc., Sioux City 3, Ia.
Alco Valve Co., 861 Kingsland Ave., St. Louis 5, Mo.
Aldrich Co., 105 E. Williams St., Wyoming, Ill.
Aldrich Pump Co., 4 Pine St., Allentown, Pa.
Alert Boiler & Mfg. Co., 9661 Robson, Detroit 27, Mich.
Alexander Bros., 406 N. 3rd, Philadelphia, Pa.
All-State Welding Alloys Co., Inc., White Plains, N. Y.
Allegheny Ludlum Steel Corp., Oliver Bldg., Pittsburgh 22, Pa.
Allan Engineering Co., P. O. Box 1211, Dallas, Tex.
Allcraft Mfg. Co., 27 Hayward St., Cambridge, Mass.
Allen-Bradley Co., 1335 S. First St., Milwaukee 4, Wis.
Allen Co., Inc., L. B., 6702 Bryn Mawr Ave., Chicago 31, Ill.
Allen Co., Robert G., P. O. Box 110, Mechanicsville, N. Y.
Allen Mfg. Co., W. D., 566 W. Lake St., Chicago, Ill.
Allen Ventilator Div., Production Planning Co., 704 Woodward, Rochester, Mich.
Alliance Industries, Huntingden Valley, Pa.
Alliance Mfg. Co., Alliance, O.
Allied Control Co., Inc., 2 East End Ave., New York 21, N. Y.
Allied Weld-Craft, Inc., 401 W. South St., Indianapolis 25, Ind.
Allin Mfg. Co., 1153 W. Grand Ave., Chicago 22, Ill.
Allington & Curtis Mfg. Co., 1800 Holland Ave., Saginaw, Mich.
Allis-Chalmers Mfg. Co., 1171 S. 70th St., Milwaukee 1, Wis.
Allis Co., Louis, The, 427 E. Stewart St., Milwaukee 7, Wis.
Alloy Stainless Products Co., Union Blvd., Totowa, N. J.
Alloy Steel Products Co., 1506 W. Elizabeth Ave., Linden, N. J.
Allpax Co., Inc., Mamaroneck, N. Y.
Alpha Metals, Inc., 56 Water St., Jersey City, N. J.
Alphil Spot Welding Co., 1058 Pacific St., Brooklyn, N. Y.
Alrose Chemical Co., Box 1294, Providence 1, R. I.
Alstrom Corp., 790 E. 176 St., Bronx 60, N. Y.
Altens Foundry & Machine Works, Inc., 226 W. Wheeling St., Lancaster, O.
Alton Mfg. Co., 1112 Ross Ave., Dallas 2, Tex.
Alton Mineral Wool Insulation Co., 2317 Whittemore Pl., St. Louis 4, Mo.
Aluminum Co. of America, Frick Bldg., Pittsburgh, Pa.
Amercoat Corp., 4809 Firestone Blvd., South Gate, Calif.
American Agile Corp., 5806 Hough Ave., Cleveland 3, O.
American Air Filter Co., Inc., 373 Central Ave., Louisville 8, Ky.
American Blower Corp., Detroit 32, Mich.
American Brass Co., 414 Meadow St., Waterbury 20, Conn.
American Car & Foundry Co., 30 Church St., New York 8, N. Y.
American Cast Iron Pipe Co., 2930 N. 16th St., Birmingham 2, Ala.
American Chemical Paint Co., Brookside Ave., Ambler, Pa.
American Cladmetals Co., P. O. Box 544, Carnegie, Pa.
American Coal Burner Co., 18 E. Erie St., Chicago 11, Ill.
American Coils Co., 360 Thomas St., Newark 5, N. J.
American Coolair Corp., 3604 Mayflower St., P. O. Box 2300, Jacksonville 3, Fla.
American Cooling Tower Co., 2710 McGee St., Kansas City 8, Mo.
American Cyanamid & Chemical Corp., 30 Rockefeller Plaza, New York, N. Y.
American District Steam Co., Inc., Bryant St., North Tonawanda, N. Y.
American District Telegraph Co., 155 Sixth Ave., New York, N. Y.
American Engineering Co., Aramingo Ave. and Cumberland St., Philadelphia 25, Pa.
American Felt Co., Glenville, Conn.
American Flange & Mfg. Co., Inc., 30 Rockefeller Plaza, New York 20, N. Y.

American Flexible Coupling Co., 1810 Pittsburgh Ave., Erie, Pa.
American Foundry & Furnace Co., Washington St. at McClun, Bloomington, Ill.
American Furnace Co., 1300 Hampton Ave., St. Louis 10, Mo.
American Gas Accumulator Co., 1027 Newark Ave., Elizabeth 3, N. J.
American Gilsonite Co., 248 S. Main St., Salt Lake City, Utah
American Hair & Felt Co., 1828 Merchandise Mart, Chicago 54, Ill.
American Hard Rubber Co., 11 Mercer St., New York 13, N. Y.
American Hydrotherm Corp., 33-70 12th St., Long Island City 6, N. Y.
American Hydrovac, Div. Pitz Foundry Inc., 290 Scholes St., Brooklyn 6, N. Y.
American Implement Co., 2523 Taylor St., Omaha, Neb.
American Injector Co.. 1000 E. McNichols, Detroit 13, Mich.
American Instrument Co., Inc., Silver Spring, Md.
American Insulated Pipe Co., 122 E. 42nd St., New York, N. Y.
American K. A. T. Corp., Garwood, N. J.
American Ladder & Scaffold Co., 5503 N. W. 7th Ave., Miami 38, Fla.
American-Larson Ventilation Co., 1004 Keystone Bank Bldg., Pittsburgh 22, Pa.
American Locomotive Co., Alco Products Div., Dunkirk, N. Y.
American Locomotive Co., Diesel Engine Div., Auburn, N. Y.
American Machine Products Co., 401 S. Third Ave., Marshalltown, Ia.
American Machine Wks., Inc., Racine, Wis.
American Manganese Bronze Co., Rhawn & Hegerman Sts., Philadelphia, Pa.
American-Marietta Co., 101 E. Ontario St., Chicago 11, Ill.
American-Marsh Pumps, Inc., 60 Capital Ave., N. E., Battle Creek, Mich.
American Metal Hose Branch, American Brass Co., The, 698 S. Main St., Waterbury 20, Conn.
American Meter Co., Inc., 60 E. 42nd St., New York 17, N. Y.
American Moistening Co., 260 W. Exchange St., Providence, R. I.
American Nickeloid Co., 113 Second St., Peru, Ill.
American Photocopy Equipment Co., 2849 N. Clark St., Chicago 14.
American Pipe Bending Machine Co., Inc., 17 Furnace St., Poultney, Vt.
American Pipe Tool Co., 4856 W. Kinzie St., Chicago 44, Ill
American Platinum Wks., 231 New Jersey Railroad Ave., Newark, N. J.
American Pulley Co., The, 4200 Wissahickon Ave., Philadelphia 29.
American Radiator & Standard Sanitary Corp., P. O. Box 1226, Pittsburgh 30, Pa.
American Sand-Banum Co., Inc., 9 Rockefeller Plaza, New York 20, N. Y.
American Screw Co., Willimantic, Conn.
American Sheet Metal Works, 331 N. Alexander, New Orleans, La.
American Shipbuilding Co., Ft. W. 54th St., Cleveland 2, O.
American Solder & Flux Co., 2152 E. Norris St., Philadelphia 25, Pa.
American Steel Band Co., P. O. Box 565, Pittsburgh, Pa.
American Steel & Wire Co., United States Steel Corp. Subsidiary, Rockefeller Bldg., Cleveland 13, O.
American Thermal Industries, Inc., 440 Illinois, Detroit 1, Mich.
American Ventilating Hose Co., 100 Park Ave., New York 17, N. Y.
American Warming & Ventilating Co., 1017-1021 Summit St., Toledo 4, O.
American Water Softener Co., Lehigh Ave. and 4th St., Philadelphia 33, Pa.
American Well Wks., 100 N. Broadway, Aurora, Ill.
American Wheelabrator & Equipment Corp., 619 S. Byrkit St., Mishawaka, Ind.
American Zinc Products Div., Ball Brothers Co., Greencastle, Ind.
Ames Iron Works, Inc., Oswego, N. Y.
Aminco Refrigeration Products Co., 1000 E. McNichols, Detroit 3, Mich.
Ammco Tools, Inc., North Chicago, Ill.
Ammerman Co., C. L., 104 N. 2nd St., Minneapolis, Minn.
Amp Corp., 2921 Locust St., St. Louis, Mo.
Ampion Corp., 4-88 47th Ave., Long Island City 1, N. Y.
Analytical Measurements, Inc., 585 Main St., Chatham, N. J.
Anchor Div., Stratton & Terstegge Co., Inc., P. O. Box 311, New Albany, Ind.
Anchor Packing Co., 401 N. Broad St., Philadelphia 8, Pa.
Andale Co., 1740 Cherry St., Philadelphia 3, Pa.
Andersen Corp., Bayport, Minn.
Anderson Co., V. D., The, 1949 W. 96th St., Cleveland 2, O.
Anderson Diesel Engine Co., 6245 State Rd., Philadelphia 35, Pa.
Anderson Products, Inc., 17 Tudor St., Cambridge 39, Mass.
Anderson-Stolz Corp., 1731 Walnut St., Kansas City 8, Mo.
Anemostat Corp. of America, 10 E. 39th St., New York 16, N. Y.
Anetsberger Bros., Inc., Northbrook, Ill.
Annis Air Filter Div., Royal Heaters, Inc., 1024 Westminster Ave., Alhambra, Calif.
Ansul Chemical Co., Refrigeration Div., Marinette, Wis.
Anti-Friction Bearings Co., 2020 S. Figueroa St., Los Angeles 7, Calif
Apex All Weather Products, Engineering Div., 228 N. La Salle St., Chicago 1, Ill.
Apollo Steel Co., 609 Warren Ave., Apollo, Pa.
Applied Mechanics Co., 167 Oliver St., Boston 10, Mass.
April Showers Co., Inc., 4126 Eighth St., N. W., Washington 11, D. C.
Aqua Electric Scale Control, Inc., 2028 E. 22nd St., Cleveland 15, O.
Aqua-Mist Co., 426 Jefferson St., Topeka, Kans.
Aqua-Therm, Inc.. 39 N. Torrence St., Dayton, O.
Aquatrol Laboratories, Inc., Clifton, N. J.
Arabol Mfg. Co., 110 E. 42nd St., New York 17, N. Y.
Arco Co., The, 7301 Bessemer Ave., Cleveland 27, O.
Arcos Corp., 1500 S. 50th St., Philadelphia 43, Pa.
Arcweld Mfg. Co., Inc., 3469 Third Ave., W., Seattle 99, Wash.
Ardee Mfg. Co., Inc., 840 N. Seward St., Los Angeles 38, Calif.
Arens Controls, Inc., 2017 Greenleaf St., Evanston, Ill.
Arex Co., 4317 Ravenswood Ave., Chicago 13, Ill.
Arjac Products Inc., 55-59 Halstead St., Rochester 10, N. Y.
Armco Drainage & Metal Products, Inc., Welded Pipe Sales Div., Middletown, O.
Armco Steel Corp., 703 Curtis St., Middletown, Ohio.
Armite Laboratories, 6609 Broad St., Los Angeles 1, Calif.
Armour and Co., Ammonia Div., 1355 W. 31st St., Chicago 9, Ill.
Armstrong Bros. Tool Co., 5200-5300 W. Armstrong Ave., Chicago 30, Ill.
Armstrong Co., The, 241 S. Post St., Detroit 17, Mich.
Armstrong Co., Richard M., Westchester, Pa.
Armstrong Cork Co., 440 Concord St., Lancaster, Pa.
Armstrong Machine Wks., 874 Maple St., Three Rivers, Mich.
Arrow-Hart & Hegeman Elect. Co., 103 Hawthorne St., Hartford 6, Conn.
Arrowhead Rubber Co., 11634 Patton Rd., Downey, Calif.
Art Valve Co., 4662 N. Lincoln Ave., Chicago 25, Ill.
Artkraft Mfg. Co., Lima, O.
Ashcraft Co., J. P., 5643 Dyer St., Dallas 6, Tex.
Ashton Valve Co., 43 Kendrick St., Wrentham, Mass.
Askania Regulator Co., 240 E. Ontario St., Chicago 11, Ill.
Associated Mills, 303 W. Monroe St., Chicago, Ill.
Atkins Saw Div., Borg-Warner Corp., 402 S. Illinois St., Indianapolis 9, Ind.
Atkomatic Valve Co., 545 W. Abbott St., Indianapolis, Ind.
Atlantic Metal Hose Co., Inc., 123 W. 64th St., New York 23, N. Y.
Atlantic Pipe Bending and Fabricating Corp., 552 River Rd., Edgewater, N. J.
Atlantic Steel Boiler Co., S. E. Cor. 22nd & Washington Ave., Philadelphia 46, Pa.
Atlantic Steel Co., P. O. Box 1714, Atlanta 1, Ga.
Atlas Chemical Co., Marietta, O.
Atlas Mfg. Co., Eustis at Robbins St., St. Paul 4, Minn.
Atlas Powder Co., Industrial Finishes Dept., North Chicago, Ill.
Atlas Valve Co., 282 South St., Newark, N. J.
Atlas Welding Accessories Co., 707 E. Lewiston Ave., Ferndale 20, Mich.
Auburn Burner Co., Lock Box 269, Auburn, Ind.
Auburn Foundry Inc., Stoker Div., Auburn, Ind.
Auer Register Co., 6600 Clement Ave., Cleveland 5, O.
Aurora Pump Co., 619 Loucks St., Aurora, Ill.
Austin Corp., Robert, 51 Albany St., Boston 11, Mass.
Autempco Corp., 520 Broadway, New York 12, N. Y.
Autoforce Ventilating System, 244 Washington St., Boston 8, Mass.
Automatic Control Co., 1005 University Ave., St. Paul 4, Minn.
Automatic Devices Co., Inc., 714 Hillgrove Ave., Western Springs, Ill.
Automatic Electric Mfg. Co., 10 State St., Mankato, Minn.
Automatic Firing Corp., 4417 Oleatha Ave., St. Louis 16, Mo.
Automatic Gas Equipment Co., 301 Brushton Ave., Pittsburgh 21, Pa.
Automatic Switch Co., 391 Lakeside Ave., Orange, N. J.
Automatic Temperature Control Co., Inc., 5212 Pulaski Ave., Philadelphia 44, Pa.
Autorad Inc., 3535 Fillmore St., Chicago 24, Ill.
Autostributor Co., 226 Leslie St., Lansing 12, Mich.
Avon Tube Div., Higbe Mfg. Co., Ewing Rd., Rochester, Mich.

B

B/W Controller Corp., 2200 E. Maple Ave., Birmingham, Mich.
Babbitt Chemical Specialties Co., 36 Prospect St., New Bedford, Mass.
Babbitt Steam Specialty Co., 1 Babbitt Sq., New Bedford, Mass.
Babcock & Wilcox Co., 161 E. 42nd St., New York 17, N. Y.
Babcock & Wilcox Co., Tubular Products Div., Beaver Falls, Pa.
Babcock & Wilcox Tube Co., Tubular Products Div., Keystone Plant, Alliance, O.
Bacharach Industrial Instrument Co., 7000 Bennett St., Pittsburgh 8, Pa.
Bache & Co., Semon Greenwich & Morton Sts., New York 14, N. Y.
Badger Fire Extinguisher Co., 624 Somerville Ave., Somerville 43, Mass.
Badger Mfg. Co., 230 Bent St., Cambridge 41, Mass.
Badham Insulation Co., Inc., Birmingham, Ala.
Baer Bros., 438 W. 37th St., New York 18, N. Y.
Pahnson Co., 1001 S. Marshall St., Winston-Salem, N. C.
Bailey Co., Chas. M., 667 Folsom St., San Francisco 7, Calif.
Bailey Meter Co., 1050 Ivanhoe Rd., Cleveland 10, O.
Baker & Co., Inc., 113 Astor St., Newark 5, N. J.
Baker Refrigeration Corp., 1508 Evans St., South Windham, Me.
Baldor Electric Co., 4353 Duncan Ave., St. Louis 10, Mo.
Baldwin Belting, Inc., 74-76 Murray St., New York 7, N. Y.
Baldwin-Hill Co., 596 Breunig Ave., Trenton 2, N. J.
Baldwin-Lima-Hamilton Corp., Philadelphia 42, Pa.
Balloffet Dies and Nozzle Co., Inc., 6825 Adams St., Guttenberg, N. J
Balmar Corp., Woodberry, Baltimore 11, Md.
Baltimore Aircoil Co., Inc., 2615-2635 Mathews St., Baltimore 18, Md.
Bar-Brook Mfg. Co., Inc., 6133 Linwood Ave., Shreveport, La.
Barber-Colman Co., 1228 Rock St., Rockford, Ill.
Barber Gas Burner Co., 3704 Superior Ave., Cleveland 14, O.
Barclay, Inc., Robert, 1236 W. Fulton St., Chicago 7, Ill.
Barco Mfg. Co., 1801 Winnemac Ave., Chicago 40, Ill.
Bard Mfg. Co., Bryan, O.
Barksdale Valves, 4905 Santa Fe Ave., Los Angeles 58, Calif.
Barnes Co., A. D., 4731 Wilmington Pike, Dayton 9, O.
Barnes & Jones, Inc., 128 Brookside Ave., Jamaica Plain, Boston 36, Mass.

Barnes Manufacturing Co., Mansfield, O.
Barnes Tool Co., The, 152 Brewery St., New Haven 6, Conn.
Barreled Sunlight Paint Co., 43 Dudley St., Providence 1, R. I.
Barrett Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Barrett, Haentjens & Co., Hazleton, Pa.
Barrett Machine Co., 912-916 Behan St., N. S., Pittsburgh 12, Pa.
Barry Corp., 765 Pleasant St., Watertown, Mass.
Bart Mfg. Co., Inc., 227 Main St., Belleville 9, N. J.
Barth Mfg. Co., Milldale, Conn.
Bartlett Mfg. Co., 3003 E. Grand Blvd., Detroit 2, Mich.
Barton Co., 719 Hennepin, Minneapolis, Minn.
Barton Instrument Corp., 1429 S. Eastern Ave., Los Angeles 22, Calif.
Barton Products, Inc., Defiance, O.
Barwick Mfg. Corp., 317 E. 18th, Wichita, Kan.
Baseline Mfg. Co., 2701 E. 78th St., Minneapolis 23, Minn.
Basic Refractories, Inc., 845 Hanna Bldg., Cleveland 15, O.
Bastian-Morley Co., Inc., LaPorte, Ind.
Bath Co., Cyril, The, E. 70th and Machinery Ave., Cleveland 3, O.
Bausch & Lomb Optical Co., 635 St. Paul St., Rochester 2, N. Y.
Bayer Co., 4030 Chouteau Ave., St. Louis 10, Mo.
Bayley Blower Co., 1817 S. 66th St., Milwaukee 14, Wis.
Beach-Russ Co., 64A Church St., New York, N. Y.
Beacon-Morris Corp., 60 Brainerd Rd., Allston, Boston 34, Mass.
Bear Mfg. Co., Industrial Div., Rock Island, Ill.
Bearings Co. of America, 501 Harrisburg Ave., Lancaster, Pa.
Bearlee Products Co., 1255 S. Monroe, Green Bay, Wis.
Beaton & Cadwell Mfg. Co., 185 Main St., New Britain, Conn.
Beaton & Corbin Mfg. Co., Southington, Conn.
Beaver Art Metal Corp., Ellwood City, Pa.
Beaver Pipe Tools, Inc., 310 Dana Ave., Warren, O.
Beck Engineering Combustion Kompany, 2100 Cole St., St. Louis 6.
Beck Mfg. Co., 315 W. Main St., New Albany, Ind.
Beckett Corp., R. W., Elyria, O.
Beckett & Co., Inc., Thomas, 2001 Willowbrook Rd., P. O. Box 7354, Dallas 9, Tex.
Beckley Perforating Co., 301 North Ave., Garwood, N. J.
Beckman & Whiteley, Inc., 958 San Carlos Ave., San Carlos, Calif.
Belco Industrial Equipment Div., 52 Iowa Ave., Paterson, N. J.
Belfield Valve Div. of Minneapolis-Honeywell Regulator Co., 435 N Broad St., Philadelphia 23, Pa.
Belgian Electric Sales Corp., 1 E. 53rd St., New York, N. Y.
Belknap Mfg. Co., 800 Union Ave., Bridgeport 1, Conn.
Bell & Gossett Co., Morton Grove, Ill.
Bellows Co., The, 230 W. Market St., Akron 9, O.
Belmont Packing & Rubber Co., The, Butler & Sepviva Sts., Philadelphia 37, Pa.
Belmont Smelting & Refining Wks., Inc., 349 Belmont Ave., Brooklyn 7, N. Y.
Belter Electric Mfg. Co., G. J., The, 3830-32 Olive St., St. Louis 8.
Benjamin Air Rifle Co., 1527 S. 8th St., St. Louis 4, Mo.
Benjamin Electric Mfg. Co., Des Plaines, Ill.
Bennett Oil Co., 964 S. Saddle Creek Rd., Omaha 6, Neb.
Benson Co., Inc., Alex R., 1040 Bay Rd., So., Hudson, N. Y.
Bergen Pipesupport Corp., 50 Church St., New York 7, N. Y.
Berger Bros. Co., 229-237 Arch St., Philadelphia 6, Pa.
Berger Mfg. Div., Republic Steel Corp., 1038 Belden Ave., Canton 5, O.
Berns Mfg. Corp., 3050 N. Rockwell St., Chicago, Ill.
Bernz Co., Otto, 280 Lyell Ave., Rochester 6, N. Y.
Bertram Co., Harvey P., The, 1008 W. 9th St., Cincinnati 3, O.
Bertsch & Co., Inc., Church St., Cambridge City, Ind.
Best Combustion Equipment Co., Inc., W. N., 415 11th St., Carlstadt, N. J.
Best Register Co., 2005 W. Oklahoma Ave., Milwaukee 15, Wis.
Bete Fog Nozzle Inc., 85 Pierce St., Greenfield, Mass.
Bethlehem Steel Co., Bethlehem, Pa.
Betz Corp., 460 State St., Hammond, Ind.
Beverly Shear Mfg. Co., 3019 W. 111th St., Chicago 43, Ill.
Biersach & Niedermeyer Co., 1937 N. Hubbard St., Milwaukee 12.
Bigelow Co., The, 174 River St., New Haven 3, Conn.
Bigelow Liptak Corp., 2550 W. Grand Blvd., Detroit 8, Mich.
Biggs Boiler Wks. Co., The, 1007 Bank St., E. Akron 5, O.
Bignall & Keeler Div., John Ramming Machine Co., 4591 McRee Ave., St. Louis 10, Mo.
Billings & Spencer Co., 1 Laurel St., Hartford 1, Conn.
Binks Mfg. Co., 3114-40 Carroll Ave., Chicago 12, Ill.
Birchfield Boiler, Inc., 2503 E. 11th St., Tacoma 1, Wash.
Bird-Archer Co., 4337 North American St., Philadelphia 40, Pa.
Birdsell Mfg. Co., Inc., 750 San Antonio Rd., Palo Alto, Calif.
Birks-Mfg. Co., 811 Hanover Rd., Meriden, Conn.
Bishop & Babcock Mfg. Co., 4901 Hamilton Ave., Cleveland 14, O.
Bituminous Coal Institute, Southern Bldg., Washington 5, D. C.
Black & Decker Mfg. Co., 628 Pennsylvania Ave., Towson 4, Md.
Black Magic Products Co., P. O. Box 1703, Tulsa, Okla.
Black Mfg. Co., The, 100 Dairy Rd., Parkton, Md.
Black-Sivalls & Bryson, Inc., 7501 E. 10th St., Kansas City 3, Mo.
Black & White Chemical Co., 130 Walnut Ave., New York 54, N. Y.
Blackhawk Mfg. Co., 5325 W. Rogers St., Milwaukee 1, Wis.
Blackmer Pump Co., 1920A Century Ave., S. W., Grand Rapids 9.
Blaisdell Compressor Co., 227 Fulton St., New York, N. Y.
Blaw Knox Construction Co., Power Piping and Sprinkler Div., 829 Beaver Ave., Pittsburgh 33, Pa.
Blazer, M., & Son, 173 Market St., Passaic, N. J.
Bliss Co., E. W., 1375 Raff Rd., S. W., Canton, O.
Blissfield Mfg. Co., Blissfield, Mich.
Blokolgas System, Inc., 70 W. Alexandrine, Detroit 1, Mich.
Blood Brothers Machine Co., Div. of Standard Steel Spring Co., Allegan, Mich.
Blower Application Co., 3165 N. 30th St., Milwaukee 16, Wis.
Blue Ridge Talc Co., Inc., Henry, Va.
Blue Seal Chemical Co., 177 Westfield Ave., W., Roselle Park, N. J.
Bodine Electric Co., 2254 W. Ohio St., Chicago 12, Ill.
Boiler Engineering & Supply Co., Manavon Rd., Phoenixville, Pa.
Bolta Products, Inc., Lawrence, Mass.
Bonafide Genasco, Inc., 295 Fifth Ave., New York 16, N. Y.
Bonney Forge & Tool Wks., 350 Green St., Allentown, Pa.
Bordo Co., Inc., L. J., 115 New St., Glenside, Pa.
Borg-Erickson Corp., 469 E. Ohio St., Chicago 11, Ill.
Borm Mfg. Co., 23 N. Union St., Elgin, Ill.
Boston Auto Gage Co., 70 West St., Pittsfield, Mass.
Boston Gear Works, Inc., North Quincy, Mass.
Boston Machine Works Co., 7 Willow St., Lynn, Mass.
Boston Woven Hose & Rubber Co., 29 Hampshire St., Cambridge, Mass.
Botfield Refractories Co., Swanson & Clymer Sts., Philadelphia 47, Pa.
Bowen Engineering, Inc., North Branch, N. J.
Bowerston Shale Co., Bowerston, O.
Bowser, Inc., 1302 E. Creighton Ave., Fort Wayne 2, Ind.
Boylston Steam Specialty Co., 116-122 W. Illinois St., Chicago, Ill.
Brabender Corp., Rochelle Park, N. J.
Bradfield, Jos. L., 10 N. Senate Ave., Indianapolis, Ind.
Brady Co., W. H., 16 E. Spring St., Chippewa Falls, Wis.
Breidert Co., G. C., 3129 San Fernando Rd., Los Angeles 65, Calif.
Bremil Mfg. Co., 1204 Pittsburgh Ave., Erie, Pa.
Bridgeport Brass Co., 30 Grand St., Bridgeport 2, Conn.
Bridgeport Thermostat Div., Robertshaw-Fulton Controls Co., Connecticut Ave., Bridgeport 1, Conn.
Bristol Co., The, P. O. Box 1790, Waterbury 20, Conn.
Broan Mfg. Co., Inc., 1669 N. Water St., Milwaukee 2, Wis.
Brockway Co., 361 Church St., Naugatuck, Conn.
Bronson Fan Mfg. Co., 1237 Riverside Dr., Los Angeles 31, Calif.
Bronze Bearings, Inc., 340 North Ave., E. Cranford, N. J.
Brooke Engineering Co., Inc., 4517 Wayne Ave., Philadelphia 44, Pa.
Brookfield Engineering Laboratories, Inc., 2 Porter St., Stoughton, Mass.
Brooklyn Varnish Mfg. Co., 50 Jay St., Brooklyn 1, N. Y.
Brooks Equipment Corp., 217 Hudson St., Hoboken, N. J.
Bros Boiler & Mfg. Co., Wm., 1057 10th Ave., S. E., Minneapolis 14.
Brown-Brockmeyer Co., Inc., P. O. Box 989, Dayton 1, O.
Brown Co., 150 Causeway St., Boston, Mass.
Brown-Electro Co., 17 N. Dewey, Oklahoma City 2, Okla.
Brown Fintube Co., The, Elyria, O.
Brown Products Co., 97-12 Metropolitan Ave., Forest Hills, N. Y.
Browning Mfg. Co., Inc., 1940 Browning Blvd., Maysville, Ky.
Brundage Co., The, 503 N. Park St., Kalamazoo 11, Mich.
Bruning Co., Inc., Charles, 4700 Montrose Ave., Chicago 41, Ill.
Brunner Mfg. Co., 1821 Broad St., Utica 1, N. Y.
Bryan Steam Corp., P. O. Box 337, Peru, Ind.
Bryant Corp., C. L., 2720 E. 79th St., Cleveland 4, O.
Bryant Heater Div., Affiliated Gas Equipment Co., Inc., 17825 St. Clair Ave., Cleveland 10, O.
Bubar, Dust Systems, Inc., Old Lyme, Conn.
Buckeye Furnace Pipe Co., Columbus 8, O.
Buckeye Tools Corp., 29 W. Apple St., Dayton 1, O.
Buda Co., Harvey, Ill.
Buensod-Stacey, Inc., 60 E. 42nd St., New York 17, N. Y.
Buffalo Bolt Co., Div. of Buffalo-Eclipse Corp., North Tonawanda, N. Y.
Buffalo Forge Co., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Meter Co., 2917 Main St., Buffalo 14, N. Y.
Buffalo Pumps, Inc., 171 Mortimer St., Buffalo 5, N. Y.
Buffalo Tank Corp., 744 Broad St., Newark 2, N. J.
Buflovac Equipment Div. of Blaw-Knox Co., 50 Winchester Ave., Buffalo 11, N. Y.
Builders-Providence, Inc., Div. of Builders Iron Foundry, 345 Harris Ave., Providence 1, R. I.
Bullard Co., The, Bridgeport 2, Conn.
Bump Pump Co., La Crosse, Wis.
Bundy Tubing Co., 8109 E. Jefferson Ave., Detroit 14, Mich.
Burden Co., Alan E., 3352 Motor Ave., Los Angeles 34, Calif.
Burdette Mfg. Co., 3433 W. Madison St., Chicago 24, Ill.
Burgess-Manning Co., Architectural Products Div., 5970 Northwest Highway, Chicago 31, Ill.
Burke Electric Co., Div. of Marathon Electric Mfg. Corp., 1201 W. 12th St., Erie, Pa.
Burling Instrument Co., Air Conditioning Div., 5 Vose Ave., South Orange, N. J.
Burnham Corp., Boiler Div., Main St., Irvington, N. Y.
Burnley Battery & Mfg. Co., 103 Clay St., North East, Pa.
Burrows Mfg. Co., F. A., 318 E. Poplar St., York, Pa.
Burt Mfg. Co., 41 E. South St., Akron 11, O.
Bury Compressor Co., 18th & Cascade Sts., Erie, Pa.
Bush Mfg. Co., 179 South St., West Hartford 10, Conn.
Byers Co., A. M., Clark Bldg., Pittsburgh 22, Pa.
Byron Jackson Co., P. O. Box 2017, Terminal Annex, Los Angeles 54, Calif.

C

CCA Products, Inc., P. O. Box 671, Glendale 5, Calif.
C & H Air Conditioning Fan Co., Inc., 1603 DeKalb Ave., N. E., Atlanta 6, Ga.
Cabot, Inc., Samuel, 141 Milk St., Boston 9, Mass.
Calbar Paint & Varnish Co., 2612-26 N. Martha St., Philadelphia 25.
Calculator Specialties Co., 122 S. Michigan Ave., Chicago 3, Ill.

Caldwell Co., W. E., 2120 Brook St., Louisville, Ky.
Calgon, Inc., Hagan Bldg., Pittsburgh 30, Pa.
California Brass Mfg. Co., 1447 Naud St., Los Angeles 12, Calif.
Callahan Can Machine Co., Inc., 80 Richard St., Brooklyn, N. Y.
Cambridge Corp., 350 S. Geddes St., Syracuse, N. Y.
Camco Products Inc., 445 State St., North Haven, Conn.
Camloc Fastener Corp., 22 Spring Valley Rd., Paramus, N. J.
Campbell Co., J. A., 645 E. Wardlaw Rd., Long Beach 7, Calif.
Campbell Heating Co., P.O. Box 833, Des Moines 4, Ia.
Campbell Heating Co., E. K., 1809 Manchester, Kansas City 3, Mo.
Cam-Stat, Inc., Div. of The Paul Henry Co., 11833 West Olympic Blvd., Los Angeles 64, Calif.
Cannon Chemical Co., Inc., 181 Portland St., Cambridge 41, Mass.
Canton Stoker Corp., 407 Andrew Place, S. W., Canton 1, O.
Canvas Products Co., 1236 S. 7th St., St. Louis 4, Mo.
Capewell Mfg. Co., Hartford 2, Conn.
Capitol Mfg. & Supply Co., 153 W. Fulton St., Columbus, O.
Carbide and Carbon Chemicals Co., A Div. of Union Carbide and Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Cardox Corp., 307 N. Michigan Ave., Chicago, Ill.
Carey Electronic Engineering Co., Metal Wool Div., 1880 Clifton Ave., Springfield, O.
Carey Mfg. Co., Philip, Wayne Ave., Lockland, Cincinnati 15, O.
Cargocaire Engineering Corp., 15 Park Row, New York 38, N. Y.
Carling Turbine Blower Co., 25 St. John's Rd., Worcester 3, Mass.
Carlon Products Corp., 10225 Meech Ave., Cleveland, O.
Carlson & Sullivan, 1617 California St., Monrovia, Calif.
Carnes, Inc., John R., Greenlawn Ave. & Erie R. R., Lima, O.
Carnes Co., W. R., Verona, Wis.
Carney Co., Inc., The, Mankato, Minn.
Carolina Aniline & Extract Co., 301 S. Cedar St., Charlotte, N. C.
Carolina Blower Co., Inc., 430 Morehead Ave., Greensboro, N. C.
Carpenter Heating & Stoker Co., 2135 St. Clair Ave., Cleveland 14, O.
Carpenter Mfg. Corp., The, 9523 Detroit Ave., Cleveland 2, O.
Carpenter & Paterson, Inc., 1190 Bennington St., East Boston 2, Mass.
Carpenter Steel Co., Alloy Tube Div., Union, N. J.
Carrier Corp., 302 S. Geddes St., Syracuse 1, N. Y.
Carty & Moore Engineering Co., 1150 W. Baltimore Ave., Detroit 26, Mich.
Carvell Heat Equipment Co., 1217 Temple St., Los Angeles 26, Calif.
Carver Pump Co., Muscatine, Ia.
Case & Son Mfg. Co., W. A., 33 Main St., Buffalo 3, N. Y.
Cash Co., A. W., P. O. Box 551, Decatur, Ill.
Cash Valve Mfg. Corp., A. W., 6621 E. Wabash Ave., Decatur, Ill.
Cashin Co., W. D., 69 A. St., Boston 27, Mass.
Catawissa Valve & Fittings Co., Catawissa, Pa.
Caterpillar Tractor Co., Peoria 8, Ill.
Catskill Metal Works, Inc., Catskill, N. Y.
Cee-Kleer Products Co., 947 W. 6th St., Cincinnati 3, O.
Celco Corp., 110 E. 42nd St., New York 17, N. Y.
Celotex Corp., The, 120 S. La Salle St., Chicago 3, Ill.
Cement Lined Pipe Co., 93 Brookline St., Lynn, Mass.
Central Brass Mfg. Co., 2950 E. 55th St., Cleveland 4, O.
Central Die Casting & Mfg. Co., Inc., 2935 W. 47th St., Chicago, Ill.
Central Foundry Co., Murray & Pacific Sts., Newark 5, N. J.
Central Rubber & Steel Corp., P. O. Box 420, Findlay, O.
Central States Mfg. Co., Inc., 1200-12 Summit St., Arkansas City, Kan.
Central States Steel Boiler Co., 4649 W. Harrison St., Chicago 44, Ill.
Central Station Steam Co., 2920 E. Woodbridge St., Detroit 7, Mich.
Central Wire & Iron Works, 621 E. Locust St., Des Moines, Ia.
Centrifix Corp., 3608 Payne Ave., Cleveland 14, O.
Centri Spray Corp., 14290 Meyers Rd., Detroit 27, Mich.
Century Electric Co., 1806 Pine St., St. Louis 3, Mo.
Century Engineering Corp., 401-431 3rd St., S. E., Cedar Rapids, Ia.
Century Fan & Ventilator Co., 41 Cedar St., Stamford, Conn.
Certain-teed Products Corp., 120 E. Lancaster Ave., Ardmore, Pa.
Certified Flexible Couplings, 341 East 233rd St., New York 70, N. Y.
Certified Furnace Co., Div. Stainless & Steel Products Co., 1000 Berry Ave., St. Paul 4, Minn.
Chace Co., W. M., 1606 Beard Ave., Detroit 9, Mich.
Chain Belt Co., 4617 W. Greenfield, Milwaukee 1, Wis.
Chamberlin Co. of America, 1254 La Brosse St., Detroit 32, Mich.
Champion Blower & Forge Co., Harrisburg Ave. and Charlotte St., Lancaster, Pa.
Champion Furnace Pipe Co., 215 Eaton St., Peoria 3, Ill.
Champion Laboratories, Inc., Meriden, Conn.
Champion Machine & Forging Co., 3695 E. 78th St., Cleveland 5, O.
Chandler Co., 804 First Ave., N. W., Cedar Rapids, Ia.
Chaplin-Fulton Mfg. Co., 5800 Grand Ave., Pittsburgh 25, Pa.
Chapman Valve Mfg. Co., The, Indian Orchard, Mass.
Char-Gale Mfg. Co., 4325 Hiawatha Ave., Minneapolis 6, Minn.
Chase Brass & Copper Co., 236 Grand St., Waterbury 20, Conn.
Chase-Shawmut Co., Newburyport, Mass.
Chelsea Fan & Blower Co., Inc., 639 South Ave., Plainfield, N. J.
Chelsea Metal Stamping Co., 95 8th Ave., New York 11, N. Y.
Chemalloy Associates, Santee, Calif.
Chemical Engineering Co., 2800 Logan St., P. O. Box 1076, Dallas 1.
Chemical Solvent Co., 3005 N. 16th St., Birmingham, Ala.
Chemical & Metallurgical Products, Inc., 74 Washington St., New York, N. Y.
Cheney Flashing Co., 623 Prospect St., Trenton 5, N. J.
Chester Cable Corp., Chester, N. Y.
Chesterton Co., A. W., 6 Ashland St., Everett 49, Mass.
Chicago Belting Co., 113-125 N. Green St., Chicago 7, Ill.
Chicago Blower Corp., 9867 Pacific Ave., Franklin Park, Ill.
Chicago Bridge & Iron Co., 332 S. Michigan Ave., Chicago 4, Ill.
Chicago Die Casting Mfg. Co., 2510-14 W. Monroe St., Chicago 12, Ill.
Chicago Expansion Bolt Co., 1338 W. Concord Pl., Chicago 22, Ill.
Chicago Fan & Fin Coil Co., 1121 S. California Ave., Chicago 12, Ill.
Chicago Fire Brick Co., 1467 N. Elston Ave., Chicago 22, Ill.
Chicago Float Works, Not Inc., Dept. T., 2330 S. Western Ave., Chicago 8, Ill.
Chicago Furnace Supply Co., 1278 Clybourn Ave., Chicago, Ill.
Chicago Gasket Co., 1275 West North Ave., Chicago 22, Ill.
Chicago Metal Mfg. Co., 3724 S. Rockwell St., Chicago 32, Ill.
Chicago Nipple Mfg. Co., 1616 S. Laramie Ave., Cicero 50, Ill.
Chicago Pneumatic Tool Co., 6 E. 44th St., New York, N. Y.
Chicago Pump Co., 622 Diversey Pkwy., Chicago 14, Ill.
Chicago Specialty Mfg. Co., 2954 Lawrence Ave., Chicago 25, Ill.
Chicago Steel Furnace Co., 9326 S. Anthony Ave., Chicago 17, Ill.
Chicago Steel Tank Co., 6400 W. 66th, Chicago 38, Ill.
Chicago-Wilcox Mfg. Co., E. 77th St. and Anthony Ave., Chicago, Ill.
Chiksan Co., Brea, Calif.
Childers Mfg. Co., 3620 W. 11th St., Houston 8, Tex.
Chisholm-Moore Co., Tonawanda, N. Y.
Chrysler Airtemp, Div. of Chrysler Corp., 1600 Webster St., Dayton 1, O.
Churchward Welding Accessories, Jack, North Haven, Conn.
Cincinnati Electrical Tool Co., The, 2684 Madison Rd., Cincinnati 8, O.
Cincinnati Metalcrafts Inc., 5000 Brotherton Rd., Cincinnati 9, O.
Cincinnati Shaper Co., Hopple, Garrard and Elam, Cincinnati 25, O.
Cinder Products Corp., 75 Ellenfield St., Providence, R. I.
Circulators & Devices Mfg. Corp., 128-168 Thirty-Second St., Brooklyn 32, N. Y.
Cissell Mfg. Co., Inc., W. M., 831 S. First St., P. O. Box 1143, Louisville 1, Ky.
Clarage Fan Co., Porter St., Kalamazoo 16, Mich.
Clark Bros. Bolt Co., Milldale, Conn.
Clark Bros. Mfg. Co., Hillsboro, Ore.
Clark Controller Co., 1146 E. 152nd St., Cleveland 10, O.
Clark Dust Control Co., 210 N. Mozart St., Chicago, Ill.
Clark Electric Co., Jas., Jr., 615 Bergman St., Louisville 3, Ky.
Clark Mfg. Co., 1830 E. 38th St., Cleveland 14, O.
Claronex Products, Inc., 239 Java St., Brooklyn 22, N. Y.
Cla-Val Co., P. O. Box 949, Alhambra, Calif.
Clay Equipment Corp., Cedar Falls, Ia.
Claymont Steel Corp., Div. of Colorado Fuel & Iron Corp., Claymont, Del.
Clayton Mfg. Co., 401 N. Temple City, El Monte, Calif.
Clayton & Lambert Mfg. Co., 1701 Dixie Hwy., Louisville 10, Ky.
Cleaver-Brooks Co., 326 E. Keefe Ave., Milwaukee 12, Wis.
Cleveland Brass Mfg. Co., The, 4606 Hamilton Ave., Cleveland, O.
Cleveland Fuel Equipment Co., 7316 Associate Ave., Cleveland 9, O.
Cleveland Graphite Bronze Co., 17000 St. Clair Ave., Cleveland 10, O.
Cleveland Humidifier Co., 7802 Wade Park Ave., Cleveland 3, O.
Cleveland Punch & Shear Works Co., E. 40th and St. Clair Ave., Cleveland 14, O.
Cleveland Crane & Eng. Co., 5866 E. 289th St., Wickliffe, O.
Clifford Mfg. Co., Div. of Standard-Thomson Corp., 152 Grove St., Waltham 54, Mass.
Climatemaker Heat Loss Calculator Co., Box 378, Bloomington, Ill.
Climax Machinery Co., 301 S. LaSalle St., Indianapolis, Ind.
Climax Metal Products Co., 863 E. 140 St., Cleveland 10, O.
Clinton Metallic Paint Co., P. O. Box 278, Clinton, N. Y.
Clizbe Bros. Mfg. Co., Plymouth, Ind.
Clow & Sons, James B., 201-299 N. Talman Ave., Chicago 12, Ill.
Cobra Pipe & Coil Co., Inc., Brook St., P. O. Box 176, Elmwood 10, Conn.
Cochrane Corp., 3131 N. 17th St., Philadelphia 32, Pa.
Coe Mfg. Co., Bank St., Painesville, O.
Coen Co., 40 Broadman Pl., San Francisco 3, Calif.
Coffin Co., J. S., Jr., 326 S. Dean St., Englewood, N. J.
Cole-Sewell Engineering Co., 2288 University Ave., St. Paul 4, Minn.
Coleman-Pettersen Corp., 2130 St. Clair Ave., Cleveland 14, O.
Colonial Alloys Co., Metals Div., Ridge Ave. and Crawford St., Philadelphia 29, Pa.
Columbia Boiler Co., Pottstown, Pa.
Columbia Engineering Service Co., 173 14th St., San Francisco 3, Calif.
Columbia Steel Co. (Sub. United States Steel Corp.), Russ Bldg., 235 Montgomery St., San Francisco 6, Calif.
Columbian Steel Tank Co., 1509 W. 12th St., Kansas City 7, Mo.
Columbus Heating & Ventilating Co., 182 N. Yale Ave., Columbus 16, O.
Columbus Steam Pump Wks. Co., 724 W. Gay St., Columbus 8, O.
Combustion Control Corp., 77 Broadway, Cambridge 42, Mass.
Combustion Engineering-Superheater, Inc., 200 Madison Ave., New York 16, N. Y.
Combustion Equipment Co., 405 Cleveland Bldg., Rock Island, Ill.
Comfort Products Corp., 2220 Lamesa, Dallas 2, Tex.
Commercial Filters Corp., 2 Main St., Melrose 76, Mass.
Commercial Plastics Co., 1198 Merchandise Mart, Chicago 54, Ill.
Commercial Shearing & Stamping Co., 1775 Logan, P. O. Box 719, Youngstown 1, O.
Commercialaire, Inc., 300 Pacific St., Brooklyn 2, N. Y.
Committee on Steel Pipe Research, American Iron and Steel Institute, 350 Fifth Ave., New York 1, N. Y.
Commonwealth Brass Corp., 5781-5835 Commonwealth Ave., Detroit 8, Mich.
Conco Engineering Works, Div. of H. D. Conkey & Co., Mendota, Ill
Condensation Engineering Corp., 3511 W. Potomac Ave., Chicago 31, Ill.
Condenser Service & Engineering Co., Inc., 95 River St., Hoboken, N. J.
Conditionaire Unit Co., 2821 Montrose Ave., Chicago 18, Ill.
Congress Drives Div., Tann Corp., 3750 E. Outer Drive, Detroit 34 Mich.

Congress Fan & Electric Co., P. O. Box 3747, Peninsula Sta., Daytona Beach, Fla.
Conneaut Plastic Metallic Packing Co., Conneaut, O.
Connery Construction Co., 2nd and Luzerne Sts., Philadelphia 40, Pa
Connor Engineering Corp., W. B., Danbury, Conn.
Conoflow Corp., Dept. P, 2100 Arch St., Philadelphia 3, Pa.
Consolidated Boiler Corp., 126 Dartmouth St., Boston 16, Mass.
Consolidated Car-Heating Co., Inc., Albany, N. Y.
Continental Air Filters, Inc., 2520 Helm St., Louisville 1, Ky.
Continental-Diamond Fibre Co., Newark, Del.
Continental Electric Co., Inc., 323 Ferry St., Newark, N. J.
Continental Machine Co., 1952-54 Maud Ave., Chicago 14, Ill.
Continental Motors Corp., Muskegon 82, Mich.
Continental Products Co., 1150 E. 222nd St., Euclid 17, O.
Continental Radiant Glass Heating Corp., 1 E. 35th St., New York 16, N. Y.
Continental Rubber Wks., 2000 Liberty St., Erie, Pa.
Continental Screw Co., Mt. Pleasant St., New Bedford, Mass.
Continental Steel Corp., 1108 S. Main St., Kokomo, Ind.
Controlair Mfg. Co., 1932 S. Compton Ave., Los Angeles, Calif.
Cook Co., Loren, 664 Front St., Berea, O.
Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.
Coolerator Co., New Garrick Bldg., Duluth, Minn.
Cooper Alloy Foundry Co., The, Bloy St. & Ramsey Ave., Hillside, N. J.
Cooper-Bessemer Corp., The, Mt. Vernon, O.
Cooper Co., Clark, Palmyra, N. J.
Cooper Hewitt Electric Co., 72-732 Grand St., Hoboken, N. J.
Copeland Refrigeration Corp., Sidney, O.
Copes-Vulcan Div., Continental Foundry & Machine Co., 939 West 26th St., Erie 4, Pa.
Copper Boiler & Heater Wks., 501 J. St., Manitowoc, Wis.
Coppus Engineering Corp., 344 Park Ave., Worcester 2, Mass.
Coral Designs, 12-16 Astoria Blvd., Long Island City 2, N. Y.
Corbman Bros., Inc., 315 N. 7th St., Philadelphia 6, Pa.
Cordo Chemical Co., 34 Smith St., Norwalk, Conn.
Cork Insulation Co., Inc., 730-5th Ave., New York, N. Y.
Corley Co., Inc., The, One Exchange Place, Jersey City 2, N. J.
Corning Glass Works, Corning, N. Y.
Cornish Wire Co., 50 Church St., New York, N. Y.
Coroaire Heater Corp., The, 1124 Hanna Bldg., Cleveland 15, O.
Corrosite Corp., Chrysler Bldg., New York, N. Y.
C-O Two Fire Equipment Co., Newark, N. J.
Coughlan Co., G. N., West Orange, N. J.
Couplings Co., 55 E. 18th St., Chicago 16, Ill.
Cox Mfg. Co., Ridgeville, Ind.
Crane Co., 836 S. Michigan Ave., Chicago 5, Ill.
Crane Packing Co., 1872 Cuyler Ave., Chicago 13, Ill.
CraneVeyor Corp., 1240 S. Boyle Ave., Los Angeles 23, Calif.
Crawford Co., 3220 W. 31st St., Chicago 23, Ill.
Crescent Tool Co., 230 Harrison St., Jamestown, N. Y.
Crocker-Wheeler Div., Elliott Co., Ampere, N. J.
Croll-Reynolds Engineering Co., Inc., 17 Johns St., New York 7, N. Y.
Croll & Son, Jesse G., 2326-2606 Germantown Ave., Philadelphia, Pa
Crosby Steam Gage & Valve Co., 43 Kendrick St., Wrentham, Mass.
Crosley Div., Avco Mfg. Corp., Cincinnati, O.
Crotty Mfg. Corp., 133-15 35th Ave., Flushing, L. I., N. Y.
Crowell & Dunn, Inc., 225 Lafayette St., New York, N. Y.
Crown Controls Co., Inc., 124 S. Washington St., New Bremen, O.
Crown Die & Tool Co., 108 N. Jefferson St., Chicago 6, Ill.
Crown Iron Works Co., 1202 N. E. Tyler, Minneapolis, Minn.
Crucible Steel Co. of America, 405 Lexington Ave., New York, N. Y.
Cryer Trap & Valve Co., Inc., 366 Madison Ave., New York 17.
Culligan Soft Water Institute, Northbrook, Ill.
Cuno Engineering Corp., 80 S. Vine St., Meriden, Conn.
Curtis Refrigerating Machine Div., Curtis Mfg. Co., 1950 Kienlen Ave., St. Louis 20, Mo.
Custom Engineering Co., 3138 W. Slauson Ave., Los Angeles 43, Calif.
Cutler-Hammer, Inc., 421 N. 12th St., Milwaukee 1, Wis.
Cyclotherm Div., United States Radiator Corp., 157 E. First St., Oswego, N. Y.

D

Daffin Mfg. Co., Lancaster, Pa.
Dahlquist Mfg. Co., Inc., Div. of Process Engineering Inc., 628 Somerville Ave., Somerville 43, Mass.
Daigger & Co., A., 161 W. Kinzie St., Chicago, Ill.
Dalmo-Victor Co., San Carlos, Calif.
Daly, Merritt & Sullivan, Inc., West Broad St., Falls Church, Va.
Dalzen Mfg. Co., 525 South Riverside, St. Clair, Mich.
Dampney Co., The, 1243 River St., Hyde Park, Boston 36, Mass.
Dana Fan & Blower Corp., 3501-37 Colerain Ave., Cincinnati 23, Ohio.
Danzer Metal Works Co., Box 201, Hagerstown, Md.
Darcoid Co., Inc., 145 Sixth Ave., New York 13, N. Y.
Darling Valve & Mfg. Co., 701 First St., Williamsport, Pa.
Dart Union Co., E. M., 134 Thurbers Ave., Providence 5, R. I.
Das Div. of The Zeller Corp., Fort Wayne Rd., Defiance, O.
Davey Compressor Co., Kent, O.
Davidson Co., M. T., 7 Dey St., New York 7, N. Y.
Davidson Hyduty Roof Fan Co., 213 California St., Newton, Mass.
Davies & Co., Wayne, Westboro, Mass.
Davis Engineering Corp., 1070 E. Grand St., Elizabeth 4, N. J.
Davis Instruments, Div. of Davis Emergency Equipment Co., Inc., 201 Halleck St., Newark 4, N. J.
Davis Regulator Co., 2546 S. Washtenaw Ave., Chicago 8, Ill.
Day & Night Div., Affiliated Gas Equipment, Inc., 700 Royal Oaks Dr., Monrovia, Calif.
Day Co., The, 810-830 Third Ave., N. E., Minneapolis 13, Minn.
Dayton Air Compressor Co., The, 427 Valley St., Dayton 4, O.
Dayton Electric Mfg. Co., 118 S. Oakley Blvd., Chicago, Ill.
Dayton Rubber Co., 2342 W. Riverview Ave., Dayton 1, O.
Dean Brothers Pumps, Inc., 323 W. 10th St., Indianapolis 7, Ind.
Dean Hill Pump Co., 4000 E. 16th St., Indianapolis 7, Ind.
Dearborn Chemical Co., Merchandise Mart Plaza, Chicago 54, Ill.
Debevoise Co., The, 74-84 20th St., Brooklyn 32, N. Y.
DeBothezat Fans Div., American Machine & Metals, Inc., East Moline, Ill.
Decatur Iron & Steel Co., P. O. Box 72, Decatur, Ala.
Decatur Pump Co., 2750 Nelson Park Rd., Decatur 70, Ill.
Deering Air Conditioning Co., 1069 Celestial, Cincinnati 12, Ohio
Defender Instrument & Regulator Co., 815 Clark Ave., St. Louis 2, Mo.
Diesel Oil Burner Corp. of New York, 105-20 New York Blvd., Jamaica, Long Island, N. Y.
De Laval Steam Turbine Co., Trenton 2, N. J.
Delavan Mfg. Co., 3007-Sixth Ave., Des Moines 13, Ia.
Delco Appliance Div., General Motors Corp., P. O. Box 230, Rochester 1, N. Y.
Delco Products Div., General Motors Corp., 329 E. First St., Dayton 1, O.
Delta-Star Electric Co., Div. of H. K. Porter Co., Inc., 2437 Fulton St., Chicago 12, Ill.
Deming Co., 14 Aetna St., Salem, O.
Demuth & Sons, Charles, 245 Elm Place, Mineola, L. I., N. Y.
Dersch, Gesswein & Neuert, Inc., 4849 W. Grand Ave., Chicago 39, Ill.
Desmond-Stephan Mfg. Co., Urbana, O.
Desolvo Co., The, 719 Foreland St., Pittsburgh 12, Pa.
d'Este Div., Kaye & MacDonald, Inc., 11-15 Central Ave., West Orange, N. J.
De-Tec-Tronic Laboratories, Inc., 1227 N. Clark St., Chicago 10, Ill.
Detroit Brass & Malleable Works, 100 S. Campbell, Detroit 9, Mich.
Detroit Controls Corp., The, 5900 Trumball Ave., Detroit 8, Mich.
Detroit Diesel Engine Div., General Motors Corp., 13400 W. Outer Dr., Detroit 23, Mich.
Detroit Hoist & Machine Co., Clay Ave. and G. T. R.R., Detroit 11, Mich.
Detroit Stamping Co., 350 Midland Ave., Detroit 3, Mich.
Detroit Stoker Co., Fifth Floor General Motors Bldg., Detroit 2, Mich.
Devices, Inc., 214 E. 53 St., New York 22, N. Y.
DeVilbiss Co. The, 300 Phillips Ave., Toledo 1, O.
Devine Mfg. Co., Inc., J. P., 49th and A.V.R.R., Pittsburgh 1, Pa.
Devoe & Raynolds Co., Inc., 44th St. and 1st Ave., New York 17, N. Y.
Dewey-Shepard Boiler Co., 1311 N. Capitol Ave., Indianapolis, Ind.
De Zurik Shower Co., Sartell, Minn.
Dial Light Co. of America, Inc., 60 Stewart Ave., Brooklyn 37, N. Y.
Diamond Chain Co., Inc., 438 Kentucky Ave., Indianapolis 7, Ind.
Diamond Chemical Products, 17 E. 48th St., New York, N. Y.
Diamond Expansion Bolt Co., Inc., 500 North Ave., Garwood, N. J.
Diamond Iron Works, Inc., 1728 Second St. N., Minneapolis 11, Minn.
Diamond Machine Tool Co., 5111 Coffman-Pico Rd., Pico, Calif.
Diamond Mfg. Co., 253 W. Eighth St., Wyoming, Pa.
Diamond Power Specialty Corp., P. O. Box 415, Lancaster, O.
Diceler Div. of General Machine & Mfg. Co., Blair St. and Spring Garden Ave., Berwick, Pa.
Dick Co., Inc., R. & J., 24-48 Sade St., Passaic, N. J.
Dickson Co., The, 7420 Woodlawn Ave., Chicago 19, Ill.
Dickinson, Aeolus, 3320 S. Artesian Ave., Chicago, Ill.
Diehl Mfg Co., Finderne Plant, 1106 Finderne Ave., Somerville, N. J.
Dietzgen Co., Eugene, 2425 Sheffield Ave., Chicago 14, Ill.
Dillon Co., Inc., W. C., 14620 Keswick St., Van Nuys, Calif.
Dillon Steam Boiler Wks., Inc., D. M., Crocker St., Fitchburg, Mass.
Dings Magnetic Separator Co., 4740 W. Electric Ave., Milwaukee 46, Wis.
Division Lead Co., 836 W. Kinzie St., Chicago 22, Ill.
Dixon Crucible Co., Joseph, Wayne & Monmouth Sts., Jersey City 3, N. J.
Doall Co., The, 254 N. Laurel Ave., Des Plaines, Ill.
Dockson Corp., 3839 Wabash Ave., Detroit 8, Mich.
Dockstader, Inc., S. E., 1128 Munsey Bldg., Washington 4, D. C.
Dodge Cork Co., Inc., Lancaster, Pa.
Dodge Mfg. Corp., 500 S. Union St., Mishawaka, Ind.
Doerr Electric Corp., Cedarburg, Wis.
Dole Refrigerating Co., 5910 N. Pulaski, Chicago 30, Ill.
Dole Valve Co., The, 1933 Carroll Ave., Chicago 12, Ill.
Dollinger Corp., 9 Centre Park, Rochester 3, N. Y.
Domestic Pump & Mfg. Corp., Shippensburg, Pa.
Dormeyer Industries, 3418 Milwaukee Ave., Chicago 41, Ill.
Double Seal Ring Co., 2065 Montgomery, Fort Worth, Tex.
Dover Metal Products Co., The, Canal Fulton, O.
Dow Chemical Co., The, Midland, Mich.
Dow Corning Corp., Midland, Mich.
Dowell Inc., P. O. Box 536, Tulsa 1, Okla.
Downingtown Iron Works, Wallace Ave., Downingtown, Pa.
Doyle & Roth Mfg. Co., Inc., Foot of 23rd St., Brooklyn 32, N. Y.
Doyle Vacuum Cleaner Co., 225 Stevens St., S. W., Grand Rapids 2, Mich.
Dravo Corp., Machinery Div., Dravo Bldg., Pittsburgh 22, Pa.
Drayer-Hanson, Inc., 3301 Medford Ave., Los Angeles 33, Calif.
Dreier Brothers, 845 So. Wabash, Chicago 5, Ill.
Dreis & Krump Mfg. Co., 7404 Loomis Blvd., Chicago 36, Ill.
Dreis Co., Ltd., Edward J., 841 County Rd., San Carlos, Calif.
Dresser Mfg. Div., Dresser Industries, Inc., 490 Fisher Ave., Bradford, Pa.
Drew & Co., Inc., E. F., 13 E. 26th St., New York, N. Y.
Drico Industrial Corp., 559 West 35 St., New York 1, N.Y.
Drinkwater, Inc., Spring & Madison St., Waukegan, Ill.
Driv-Way Lite Co., P. O. Box 2850, Denver, Colo.

Drying Systems, Inc., 1812½ W. Foster Ave., Chicago 40, Ill.
Dual-Air Fan Co., P. O. Box 169, South Elgin, Ill.
Ducon Co., 147 E. 2nd St., Mineola, N. Y.
Dudgeon, Inc., Richard, 789 Bergen St., Brooklyn 16, N. Y.
Duffy Engineering Co., 536 S. E. 6th, Portland 14, Ore.
Dunham Co., C. A., 400 W. Madison St., Chicago 6, Ill.
Dunkirk Radiator Corp., Dunkirk, N. Y.
Duo-Therm Div., Motor Wheel Corp., Lansing 3, Mich.
du Pont de Nemours & Co., E. I., Polychemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Electrochemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., Inc., E. I., Kinetic Chemicals Div., 10th and Market Sts., Wilmington 98, Del.
du Pont de Nemours & Co., Inc., E. I., Fabrics & Finishes Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Grasselli Chemicals Dept., Wilmington 98, Del.
du Pont de Nemours & Co., E. I., Photo Products Dept., Wilmington 98, Del.
Durabla Mfg. Co., 114 Liberty St., New York 6, N. Y.
Durakool, Inc., 1010 N. Main St., Elkhart, Ind.
Duraloy Co., Scottdale, Pa.
Durant Insulated Pipe Co., Palo Alto, Calif.
Durant International Corp., Williamstown, N. J.
Duriron Co., Inc., The, 450 U. Findlay St., Dayton 1, O.
Durkee-Atwood Co., 215 N. E. 7th St., Minneapolis, Minn.
Duro Co., 537 Monument Ave., Dayton, O.
Duro Metal Products Co., 2649 N. Kildare Ave., Chicago, Ill.
Dust Filter Co., 134 S. LaSalle St., Chicago 3, Ill.
Dust Suppression & Engineering Co., 154 Grove St., Lake Orion, Mich.
Dustlix Corp., 715 N. Van Buren St., Milwaukee, Wis.
Dutton Boiler Div., Hapman-Dutton Co., 623 Gibson St., Kalamazoo 6, Mich.
Dwyer Mfg. Co., F. W., 323 S. Western Ave., Chicago 12, Ill.
Dy-Check Co., Div. of Northrop Aircraft, Inc., 1515 E. Broadway, Hawthorne, Calif.
Dynamic Air Engineering, Inc., 7412 Maie Ave., Los Angeles 1,
Dzus Fastener Co., Inc., P. O. Box 185, Babylon, N. Y.

E

Eagan Co., Inc., Walter H., 2336-38 Fairmount Ave., Philadelphia 30, Pa.
Eagle Chemical Co., Inc., P. O. Box 1221, Joliet, Ill.
Eagle-Picher Co., American Bldg., Cincinnati 1, O.
Eastern Air Devices, Inc., 585 Dean St., Brooklyn 17, N. Y.
Eastern Industries Inc., 396 Elm St., New Haven 6, Conn.
Eastern Stainless Steel Corp., P. O. Box 1975, Baltimore 3, Md.
Eastman Kodak Co., Kodak Park, Rochester 4, N. Y.
Ebco Mfg. Co., 401 W. Town St., Columbus 8, O.
Eckhart Mfg. Co., Inc., 831 Lehigh Ave., Union, N. J.
Eclipse Air Brush Co., Inc., 381 Park Ave., Newark, N. J.
Eclipse Fuel Engineering Co., 1139 Buchanan St., Rockford, Ill.
Econocol Stoker Div. of Cotta Transmission Co., 2340 11th St., Rockford, Ill.
Economy Equipment Co., 919 W. 49th Pl., Chicago 9, Ill.
Economy Valve Seat Co., 1436 N. Keating, Chicago 51, Ill.
Eddington Metal Specialty Co., P. O. Box K, Eddington, Pa.
Eddy Stoker Corp., 4717 W. North Ave., Chicago 39, Ill.
Eddy Valve Co., Waterford, N. Y.
Edge Moor Iron Wks., Inc., Edge Moor 25, Del.
Edison, Inc., Thomas A., Instrument Div., 60 Lakeside Ave., West Orange, N. J.
Edward Valves, Inc., 1200 W. 145th St., East Chicago, Ind.
Edwards, L. V., 32 Irving Place, Rockville Center, N. Y.
Edwards Engineering Corp., Pompton Plains, N. J.
Ehret Magnesia Mfg. Co., Valley Forge, Pa.
Eiker Mfg. Co., Ogallala, Neb.
Eisler Engineering Co., Inc., 754 S. 13th St., Newark 3, N. J.
Elastic Porcelain Lining Corp., 221 Norris Dr., Rochester 10, N. Y.
Elastic Stop Nut Corp. of America, 2330 Vauxhall Rd., Union, N. J.
Elco Tool & Screw Corp., 1800 Broadway, Rockford, Ill.
Electradiant Corp., 500 Del Monte Ave., Monterey, Calif.
Electric Arc, Inc., 152 Jelliff Ave., Newark 8, N. J.
Electric Auto-Lite Co., Instrument & Gauge Div., Toledo 1, O.
Electric Controller & Mfg. Co., 2700 E. 79th St., Cleveland 4, O.
Electric Machinery Mfg. Co., 1331 Tyler St., N. E., Minneapolis 13, Minn.
Electric Motor Corp., Div. of Howard Industries, Inc., Racine, Wis.
Electric Sprayit Co., The, 1415-25 Illinois Ave., Sheboygan, Wis.
Electric Steel Foundry Co., 2141 N. W. 25th St., Portland, Ore.
Electriglas Corp., Bergenfield, N. J.
Electrimatic Co., Sales Affiliate, Jas. P. Marsh Corp., 3501 Howard St., Skokie, Ill.
Electro Dynamic, Div. of the Electric Boat Co., Bayonne, N. J.
Electro Products Laboratories, Inc., 4501 N. Ravenswood Ave., Chicago, Ill.
Electro Rust-Proofing Corp., Belleville, N. J.
Electrol Burner Mfg. Co., Inc., 22 Union Ave., Rutherford, N. J.
Electromode Corp., 45 Crouch St., Rochester 3, N. Y.
Electro-Switch & Controls Inc., 5755 Camille Ave., Culver City, Calif.
Electrovent Fan & Mfg. Co., 812 W. Lake St., Chicago 7, Ill.
Elgin Softener Corp., Elgin, Ill.
Elgo Shutter & Mfg. Co., 2738 W. Warren Ave., Detroit 8, Mich.
Elliott Co., Jeannette, Pa.
Ellis Drier Co., 2444 N. Crawford Ave., Chicago 39, Ill.
Ellison Draft Gage Co., 548 W. Monroe St., Chicago, Ill.
Elraco Engineering Co., 732 W. 58th St., Los Angeles 37, Calif.
Emerson Electric Mfg. Co., The, 8100 Florissant Ave., St. Louis 21, Mo.
Empire Ventilation Equipment Co., 35-39 Vernon Blvd., Long Island City, N. Y.
Enderle, Inc., Ltd., Frank X., 1715 San Fernando Rd., Los Angeles 65, Calif.
Endura Mfg. Corp., 45 N. 4th St., Quakertown, Pa.
Engelhard, Inc., Charles, 850 Passaic Ave., East Newark, N. J.
Engineer Co., 75 West St., New York 6, N. Y.
Engineered Products Co., 6121 Morton St., Philadelphia 44, Pa.
Enterprise Engine & Machinery Co., Subsidiary of General Metals Corp., 18th & Florida Sts., San Francisco 10, Calif.
Equipoise Controls, 100 Stevens Ave., Mount Vernon, N. Y.
Erdle Perforating Co., 171 York St., Rochester 11, N. Y.
Ergolyte Mfg. Co., 3627 Lawrence St., N., Philadelphia 40, Pa.
Erickson Specialty Co., 10 Cayuga St., P. O. Box 141, Cohoes, N. Y.
Erie Bolt & Nut Co., Erie, Pa.
Erie City Iron Wks., 1450 East Ave., Erie, Pa.
Erie Tool Wks., 735 W. 12th St., Erie, Pa.
Ernst Water Column & Gauge Co., Livingston, N. J.
Ess Instrument Co., 96 S. Washington Ave., Bergenfield, N. J.
Ess Specialty Corp., 96 S. Washington Ave., Bergenfield, N. J.
Essex Wire Corp., 1601 Wall Street, Ft. Wayne 6, Ind.
Essick Mfg. Co., 1950 Santa Fe Ave., Los Angeles 21, Calif.
Eston Chemicals, Div. American Potash & Chemical Corp., 3100 E. 26th St., Los Angeles, Calif.
Eutectic Welding Alloys Corp., 172 St. & Northern Blvd., Flushing 58, New York, N. Y.
Even-Ray Co., Inc., 93 Tiffany Blvd., Newark 4, N. J.
Everhot Products Co., 2059 W. Carroll, Chicago 12, Ill.
Everite Pump & Mfg. Co., Inc., 617 No. Prince St., Lancaster, Pa.
Everlasting Valve Co., 49 Fisk St., Jersey City 5, N. J.
Evis Mfg. Co., 40 Boardman Pl., San Francisco 3, Calif.
Ewing Mfg. Co., 2545 N. W. 10th, Oklahoma City 7, Okla.
Excelsior Leather Washer Mfg. Co., 720-730 Chestnut St., Rockford, Ill.
Excelsior Steel Furnace Co., The, 118 S. Clinton St., Chicago 6, Ill.
Excelsior Tool & Machine Co., 31st & Ridge Ave., East St. Louis, Ill.
Extruded Plastics, Inc., New Canaan Ave., Norwalk, Conn.

F

Fasco Industries, Inc., P. O. Box 509, Rochester 2, N. Y.
Faber Engineering Co., Inc., Amber & Westmoreland Sts., Philadelphia 34, Pa.
Fabreeka Products Co., Inc., 222 Summer St., Boston, Mass.
Fafnir Bearing Co., The, 37 Booth St., New Britain, Conn.
Fageol Heat Machine Co., 5725 Mt. Elliott Ave., Detroit 11, Mich.
Fairbanks Co., The, 393 Lafayette St., New York 3, N. Y.
Fairbanks, Morse & Co., 600 S. Michigan Ave., Chicago 5, Ill.
Fairmont Aluminum Co., Fairmont, W. Va.
Fairmount Tool & Forging, 10611 Quincy Ave., Cleveland 6, O.
Falcon Equipment Co., 13th St., New Brighton, Pa.
Falk Corp., 3010 W. Canal St., Milwaukee 8, Wis.
Falstrom Co., 26 Falstrom Court, Passaic, N. J.
Famco Machine Co., 3114 Sheridan Rd., Kenosha, Wis.
Fano-Flame Oil Burner Corp., 3323 Olive St., Huntington Park, Calif.
Farley Sleeve & Hanger Co., 3748 E. 71st St., Cleveland, O.
Farquhar Co., A. B., 142 N. Duke St., York, Pa.
Farr Co., P. O. Box 10187, Airport Station, Los Angeles 45, Calif.
Farrar & Trefts, 20 Milburn St., Buffalo 12, N. Y.
Farris Engineering Corp., 400 Commercial Ave., Palisades Park, N. J.
Farris Stacon Corp., 563 Commercial Ave., Palisades Park, N. J.
Fedders-Quigan Corp., 57 Tonawanda St., Buffalo 7, N. Y.
Federal Machine & Welder Co., The, Overland Ave., Warren, O.
Federal-Mogul Corp., 11031 Shoemaker St., Detroit 13, Mich.
Federal Oil Burner Co., Inc., 3620 Walnut St., Philadelphia 4, Pa.
Federated Metals Div., American Smelting & Refining Co., 120 Broadway, New York 5, N. Y.
Fee & Mason Mfg. Co., Inc., Manasquan, N. J.
Fee and Stemwedel, Inc., 2210 Wabansia Ave., Chicago 47, Ill.
Felt Products Mfg. Co., 1504 Carroll Ave., Chicago 7, Ill.
Felters Company, The, 210 South St., Boston 11, Mass.
Fenwal Inc., 130 Pleasant St., Ashland, Mass.
Ferguson & Lange Foundry Co., 1039 Willow St., Chicago, Ill.
Fern, Ralph, 2517 Boulevard Ave., Scranton 9, Pa.
Ferro-Nil Corp., 381 Fourth Ave., New York 16, N. Y.
Field Control Div., H. D. Conkey & Co., Mendota, Ill.
Fielden Instrument Div., Robertshaw-Fulton Controls Co., 2920 N. 4th St., Philadelphia 33, Pa.
Filtair Mfg. Co., 487 S. Van Ness Ave., San Francisco 3, Calif.
Filtrine Mfg. Co., Inc., 53A Lexington Ave., Brooklyn 5, N. Y.
Finn & Co., Inc., T. R., 333 Jackson Ave., New York 54, N. Y.
Fire-King Stoker Co., 3760 E. St. Clair, Indianapolis, Ind.
Fireline Stove & Furnace Lining Co., 1800 Kingsbury St., Chicago 14, Ill.
Firestone Industrial Products, 1200 Firestone Pkwy., Akron 17, O.
Fir-Tex Insulating Board Co., St. Helens, Ore.
Fischer & Porter Co., 600 County Line Rd., Hatboro, Pa.
Fish-Schurman Corp., 70 Portman Rd., New Rochelle, N. Y.
Fisher Governor Co., 205 S. First Ave., Marshalltown, Ia.
Fisher Research Laboratory, Inc., 1961 University Ave., Palo Alto, Calif.
Fitch, Allen & Co., 1131 Bryn Mawr Ave., Chicago 40, Ill.
Fitzgibbons Boiler Co., Inc., 101 Park Ave., New York 17, N. Y.
Flagg & Co., Inc., Stanley G., 1421 Chestnut St., Philadelphia 2, Pa.
Flemm Lead Co., Inc., Bradley Ave. & School St., Long Island City 1, N. Y.

Flexible Metal Hose Mfg. Co., 640 W. 17th St., Costa Mesa, Calif.
Flexible Tubing Corp., Guilford, Conn.
Flexitallic Gasket Co., 918 N. 8th St., Camden, N. J.
Flexlock Corp., 218 Gougler Ave., Kent, O.
Flexo Supply Co., Inc., 4649 Page Blvd., St. Louis 13, Mo.
Flexonics Corp., 1315 S. Third Ave., Maywood, Ill.
Flexrock Co., 36 & Filbert Sts., Philadelphia 4, Pa.
Flintkote Co., The, 30 Rockefeller Plaza, New York 20, N. Y.
Flori Pipe Co., The, 601 E. Red Bud Ave., St. Louis 15, Mo.
Floridin Co., Warren, Pa.
Fluid Heat Div., Anchor Post Products, Inc., 6500 Eastern Ave., Baltimore 24, Md.
Fluid Systems, Inc., 1881 Dixwell Ave., New Haven 14, Conn.
Fluor Corp., Ltd., The, 2500 S. Atlantic Blvd., Los Angeles 22, Calif.
Flynn & Emrich Co., 301 Holliday St., Baltimore 2, Md.
Follansbee Steel Corp., 3rd and Liberty Aves., Pittsburgh, Pa.
Forney Engineering Co., 2705 Hawes St., Dallas 9, Tex.
Ft. Worth Steel & Machinery Co., P. O. Box 1038, Ft. Worth, Tex.
Forty-Eight Insulations, Inc., P. O. Box 472, Aurora, Ill.
Fossum, M. H., 2086 Marshall Ave., St. Paul, Minn.
Foster Co., Benjamin, 4635 W. Girard Ave., Philadelphia 31, Pa.
Foster Engineering Co., 835 Lehigh St., Union, N. J.
Foster Pump Wks., Inc., 46-A Washington St., Brooklyn 1, N. Y.
Foster Wheeler Corp., 165 Broadway, New York 6, N. Y.
Foxboro Co., 106 Neponset Ave., Foxboro, Mass.
Fram Corp., Providence 16, R. I.
France Packing Co., 6512 State Rd., Tacony, Philadelphia 35, Pa
Franklin Electric Co., Inc., 116 E. Washington St., Bluffton, Ind.
Frasse & Co., Peter A., 17 Grand, New York, N. Y.
Frederick Iron & Steel Inc., E. 7th St., Frederick, Md.
Freed Products Co., 1510 Third Ave., Moline, Ill.
Freeman Stoker Div., Illinois Iron & Bolt Co., 914 S. Michigan Ave., Chicago 5, Ill.
Fresh'nd-Aire Co., Div. of Cory Corp., 221 N. LaSalle St., Chicago 1.
Fretz-Moon Tube Co., Inc., P. O. Box 551, Butler, Pa.
Frick Co., Waynesboro, Pa.
Fricke, Fred J., 4404 Avenida Estrellita, Albuquerque, N.M.
Friermood Machine Works, Converse, Ind.
Friez Instrument Div., Bendix Aviation Corp., Taylor Ave., Towson. Baltimore 4, Md.
Frigidaire Div., General Motors Corp., Dayton 1, O.
Frontier Bronze Corp., Packard Rd., Niagara Falls, N. Y.
Frost Mfg. Co., S. Henderson St., Galesburg, Ill.
Fuel Savers, Inc., 15th and Herr Sts., Harrisburg, Pa.
Fuelguard Co., 5643 Dyer St., Dallas 6, Tex.
Fulflo Specialties Co., Inc., The, Blanchester, O.
Fuller Co., 124 Bridge St., Catasauqua, Pa.
Fuller Co., D. William, 2320 E. 75th St., Chicago 49, Ill.
Fuller Co. of Calif., H. B., 1060 Howard, San Fancisco, Calif.
Fulton Sylphon Div., Robertshaw-Fulton Controls Co., Box 400, Knoxville 4, Tenn.
Furnas Electric Co., Batavia, Ill.

G

G. D. S. Machinery & Supply Co., Inc., 101 Walker St., New York. N. Y.
G & H Mfg. Co., 3047 Amber St., Philadelphia 34, Pa.
G. M. Mfg. Co., 50 W. 3rd St., New York 12, N. Y.
G & O Mfg. Co., 138 Winchester Ave., New Haven 8, Conn.
Gaines-Collins, Quijada Tool Division, 5474-78 Alhambra Ave., Los Angeles 32, Calif.
Gallaher Co., The, 4108 Dodge St., Omaha 3, Neb.
Galv-Weld Products, 602 Cook Tower, Lima, O.
Gannon Co., Inc., Russell R., The, 5037 Beech St., Cincinnati 12, O.
Garden City Fan Co., 332 S. Michigan Ave., Chicago 4, Ill.
Garden City Instruments, Inc., 608 S. Dearborn St., Chicago 5, Ill.
Gardiner Metal Co., 2514 W. 48th Pl., Chicago 32, Ill.
Gardner-Denver Co., Quincy, Ill.
Garlock Packing Co., 50 Main St., Palmyra, N. Y.
Gas & Oil Industry Laboratories, Inc., 4 Paine Ave., Irvington, N. J.
Gasflux Co., Mansfield, O.
Gasoilair Equipment Co., P. O. Box 768, New Haven, Conn.
Gates & Co., Inc., George W., Hempstead Turnpike & Lucille Ave., Franklin Sq., L. I., N. Y.
Gates Engineering Co., P. O. Box 1711, Wilmington, Del.
Gates Rubber Co., The, 999 S. Broadway, Denver 17, Colo.
Gateway Engineering Co., 3233 W. Grand Ave., Chicago, Ill.
Gatke Corp., 228 N. LaSalle St., Chicago 1, Ill.
Gehri Co., 1117 Tacoma Ave., Tacoma 3, Wash.
General Blower Co., 8610 Ferris Ave., Morton Grove, Ill.
General Blower Co., Inc., 6137 Market St., Philadelphia 39, Pa.
General Ceramics & Steatite Corp., Keasbey, N. J.
General Chemicals Div., Allied Chemical & Dye Corp., 40 Rector St., New York, N. Y.
General Controls Co., 801 Allen Ave., Glendale 1, Calif.
General Corporation, 3353 University Ave., Minneapolis 14. Minn.
General Die and Stamping Co., 262-272 Mott St., New York 12, N. Y.
General Electric Co., Air Conditioning Dept., 5 Lawrence St., Bloomfield, N. J.
General Electric Co., Apparatus Sales Div., 1 River Rd., Schenectady 5, N. Y.
General Electric Co., Chemical Dept., 1 Plastics Ave., Pittsfield, Mass.
General Electric Co., Construction Materials Div., Bridgeport, Conn.
General Electric Co., Lamp Div., Nela Park, Cleveland 12, O.
General Filter Co., 923 Second Ave., Ames, Ia.
General Filters, Inc., 12890 Westwood, Detroit 23, Mich.
General Fittings Co., 123 Georgia Ave., Providence 5, R. I.
General Gas Light Co., 212 N. Park, Kalamazoo 11F, Mich.
General Heaters & Regulators Co., 4102 S. LaSalle St., Chicago 9
General Heating Products Co., 1205-07 Hamilton St., Philadelphia, Pa.
General Insulating Products Co., 8821 15th Ave., Brooklyn, N. Y.
General Machinery Co., 3500 Riverside Ave., Spokane 1, Wash.
General Ozone Corp., 1455 W. Congress St., Chicago 7, Ill.
General Plate Div., Metals & Controls Corp., 34 Forest St., Attleboro, Mass.
General Power Plant Corp., 10 St. Paul's Pl., Ossining, N. Y.
General Scientific Equipment Co., 27th & Huntingdon Sts., Philadelphia 32, Pa.
Gerett Corp., M. A., 724 W. Winnebago St., Milwaukee 5, Wis.
Germatrol Corp., 622 Brookline Blvd., Pittsburgh 26, Pa.
Gerrard & Co., A. J., 1950 Hawthorne Ave., Melrose Park, Ill.
Gerstein & Cooper Inc., 1 W. 3rd St., South Boston, Mass.
Giannini & Co., Inc., G. M., 254 W. Colorado St., Pasadena 1, Calif.
Giant Mfg. Co., South Ave., Council Bluffs, Ia.
Gilbert & Barker Mfg. Co., West Springfield, Mass.
Gilbert Brass Foundry Co., 5028 Farlin St., St. Louis, Mo.
Gil-Lair Products, Inc., 81 Masonic Ct., Pasadena 3, Calif.
Gisholt Machine Co., 1253 E. Washington Ave., Madison 10, Wis
Glaser Lead Co., Inc., 31 Wyckoff Ave., Brooklyn, N. Y.
Glasfloss, 155 E. 44th St., New York 17, N. Y.
Gleason-Avery, Inc., 27 Clark St., Auburn, N. Y.
Glenn-Roberts Co., Inc., 2107 Adams St., Indianapolis 18, Ind.
Glenwood-Inglewood Co., Glenwood Ave. at Thomas, Minneapolis 5, Minn.
Globe Phone Mfg. Co., 2 Linden St., Reading. Mass.
Globe Steel Tubes Co., 3839 W. Burnham St., Milwaukee 4. Wis.
Goder Incinerator Corp., 407 S. Dearborn St., Chicago 5, Ill.
Goethel Sheet Metal Wks., Alfred, 3218 W. Fond du Lac Ave., Milwaukee 10, Wis.
Golden-Anderson Valve Specialty Co., Keenan Bldg., Pittsburgh, Pa
Goldens' Foundry & Machine Co., Columbus, Ga.
Goodfellow Co., E. D., 496 E. Bodley Ave., Memphis, Tenn.
Goodrich Co., B. F., 548 S. Main St., Akron 18, O.
Goodyear Tire & Rubber Co., 1144 E. Market St., Akron 16, O.
Gordon & Piatt, P. O. Box 331, Winfield, Kan.
Gorman-Rupp Co., Mansfield, O.
Gorton Heating Corp., Cranford, N. J.
Goss Gas Inc., 5209 Baum Blvd., Pittsburgh 24, Pa.
Gotham Instrument Co., Div., American Machine & Metals, Inc., 149 Wooster St., New York 12, N. Y.
Goulds Pumps, Inc., Fall St., Seneca Falls, N. Y.
Governair Corp., 513 N. Blackwelder St., Oklahoma City 1, Okla.
Grabler Mfg. Co., 6565 Broadway, Cleveland 5, O.
Graham Mfg. Co., Inc., 415 Lexington Ave., New York 17, N. Y.
Graham Transmissions, Inc., 3754 N. Holton St., Milwaukee 12, Wis.
Granite City Steel Co., 20th & Madison Ave., Granite City, Ill.
Grant Wilson Inc., 141 W. Jackson Blvd., Suite 1560, Chicago, Ill.
Graton & Knight Co., 356 Franklin St., Worcester 4, Mass.
Graver Water Conditioning Co., 216 W. 14th St., New York 11, N. Y.
Gray Co., Inc., Graco Square, Minneapolis 13, Minn.
Gray Metal Products, Inc., 30 Carleton St., Rochester, N. Y.
Great National Air Conditioning Corp., 342 Oklahoma Natural Bldg., Oklahoma City, Okla.
Green Fire Brick Co., A. P., Mexico, Mo.
Green Fuel Economizer Co., 780 Main St., Beacon, N. Y.
Greene, Tweed & Co., North Wales, Pa.
Greenfield Tap & Die Corp., Sanderson St., Greenfield, Mass.
Greenlee Tool Co., Div. of Greenlee Bros. & Co., 2136 12th St., Rockford, Ill.
Greer Hydraulics, Inc., 454 18th St., Brooklyn 15, N. Y.
Greiner Co., Emil, 20-26 N. Moore St., New York 13, N. Y.
Greyhound A. C. Arc Welder Corp., 606 Johnson Ave., Brooklyn 6, N. Y.
Grief, Edward C., 64 West End Ave., Bogota, N. J.
Griffin & Co., 500 Bergman Ave., Louisville 8, Ky.
Griffith Equipment Co., Inc., Los Angeles, Calif.
Grinnell Co., Inc., 260 W. Exchange St., Providence 1, R. I.
Grip Nut Co., 310 S. Michigan Ave., Chicago, Ill.
Griscom-Russell Co., The, Massillon, O.
Gro-Quick Co., 340 W. Huron St., Chicago 10, Ill.
Gross-Aire Mfg. Co., 9416 W. Milton Ave., Overland 14, Mo.
Grove Regulator Co., 6529 Hollis St., Oakland, Calif.
Guardian Electric Mfg. Co., 1621 W. Walnut St., Chicago 12, Ill.
Guardian Products Corp., 1215 E. 2nd St., Michigan City, Ind.
Guild & Garrison, Inc., 43 Keap St., Brooklyn 11, N. Y.
Gulf Oil Corp., P. O. Box 1166, Gulf Bldg., Pittsburgh 30, Pa.
Gunnite Foundries Corp., 302 Peoples Ave., Rockford, Ill.
Gustin-Bacon Mfg. Co., 210 W. 10th St., Kansas City 6, Mo.
Guth Co., Edwin F., 2615 Washington Blvd., St. Louis 3, Mo.

H

H. A. Mfg. Co., 1612 W. King St., York, Pa.
H-B Instrument Co., American & Bristol Sts., Philadelphia 40, Pa.
H & H Tube & Mfg. Co., 245-275 N. Forman Ave., Detroit 17, Mich
H-P Products, Inc., Louisville, O.
Haering & Co., Inc., D. W., P. O. Box 6037, Harlandale Sta., San Antonio, Tex.
Haertel Co., Walter, 2840 4th Ave., S., Minneapolis, Minn.
Hagan Corp., Hagan Bldg., Pittsburgh 30, Pa.
Hager Bros., East P. O. Box 1511, Rockford, Ill.
Hague & Co., Alfred, 230 Thirty-fourth St., Brooklyn 32, N. Y.
Haines & Co., Inc., William S., Div. Sellers Injector Corp., 1010-12-14 Wood St., Philadelphia 7, Pa.
Halstead & Mitchell, Bessemer Bldg., Pittsburgh 22, Pa.

Hamburg Boiler Wks., Inc., Grand St., Hamburg, Pa.
Hamer Oil Tool Co., 2919 Gardenia Ave., Long Beach 6, Calif.
Hamilton Rubber Mfg. Corp., Box 361, Trenton 3, N. J.
Hammel-Dahl Co., 243 Richmond St., Providence 3, R. I.
Hammett Electric Mfg. Co., 209 W. 19th Terrace, Kansas City 8, Mo.
Hammond Brass Wks., Summer Blvd., Hammond, Ind.
Hampton-Cross Co., The, 120 S. 10th St., Louisville 2, Ky.
Hampton Electric Mfg. Co., 1238 Voskamp St., Pittsburgh 12, Pa.
Handy & Harman, 82 Fulton St., New York 38, N. Y.
Haney Gas Burner & Engineers, 909 S. Myrtle Ave., Monrovia, Calif.
Hanna Engineering Wks., 1765 N. Elston, Chicago 22, Ill.
Hanovia Chemical & Mfg. Co., 100 Chestnut St., Newark 5, N. J.
Hansen Mfg. Co., Inc., Princeton 6, Ind.
Hanson-Gates Mfg. Co., Inc., 8 Prescott St., Reading, Mass.
Hardinge Oil Burner & Mfg. Co., 1700 Berteau St., Chicago 13, Ill
Hardy, Inc., Charles, 420 Lexington Ave., New York, N. Y.
Harnischfeger Corp., 4400 W. National Ave., Milwaukee 46, Wis.
Harper Co., H. M., Morton Grove, Ill.
Harrington & King Perforating Co., 5655 Fillmore St., Chicago 44, Ill
Harris, A. R., 4548 Hohman Ave., Hammond, Ind.
Harris Calorific Co., The, 5501 Cass Ave., N. W., Cleveland 2, O.
Harris & Co., Arthur, 210 N. Aberdeen St., Chicago 7, Ill.
Harrisburg Steel Corp., 10th & Herr Sts., Harrisburg, Pa.
Harry Cooling Towers, Inc., 125 Cedar St., New York 6, N. Y.
Hart & Cooley Mfg. Co., Holland, Mich.
Hart Mfg. Co., The, Hamilton St., Hartford 1, Conn.
Hartmann Co., Chas., 985 Dean St., Brooklyn, N. Y.
Hartzell Propeller Fan Co., P. O. Box 909, Roosevelt Ave., Piqua, O.
Harvey-Whipple, Inc., Springfield, Mass.
Hasco Valve & Machine Co., 1263 N. 70th St., Milwaukee 13, Wis
Haskell Mfg. Co., Wm. H., 24 Commerce St., Pawtucket, R. I.
Hastings Air Conditioning Co., Box 481, 108 S. Colorado Ave., Hastings, Neb.
Hastings Instrument Co., Inc., Superhighway at Pine Ave., Hampton 33, Va.
Hauck Mfg. Co., 127-137 10th St., Brooklyn 15, N. Y.
Hausman Mfg. & Sales Co., Dept. HP, 1243 N. Harding Ave., Chicago 51, Ill.
Haveg Corp., Newark, Del.
Haydon Mfg. Co., Inc., Sub. General Time Instruments Corp., Torrington, Conn.
Hayes Furnace Mfg. & Supply Co., 2929 S. Fairfax Ave., Los Angeles 16, Calif.
Hays Corp., 800 E. 8th St., Michigan City, Ind.
Hays Mfg. Co., 801 W. 12th St., Erie, Pa.
Health Trola Div., Excel Heating & Air Conditioning Co., 3715 Belmont Ave., Chicago 18, Ill.
Healy Ruff Co., 2257 University Ave., St. Paul 4, Minn.
Heartley Machine & Tool Co., 900-8 Summit St., Toledo, O.
Heat Equipment, Not Inc., 1020 E. 75th St., Chicago 19, Ill.
Heat Timer Corp., 160 Fifth Ave., New York 10, N. Y.
Heat X-Changer Co., Inc., The, Brewster, N. Y.
Heating Assurance, Inc., 124 E. Augusta St., Spokane 13, Wash.
Hegeler Zinc Co., P. O. Box 599, Danville, Ill.
Heil Process Equipment Corp., 12901 Elmwood Ave., Cleveland, O.
Helical Tube Corp., 19 Washington Street, East Orange, N. J.
Helicoid Gage Div., American Chain & Cable Co., Inc., Bridgeport 2. Conn.
Hendley & Whittemore, 6 Blackhawk Blvd., Beloit, Wis.
Hendrick Mfg. Co., 37 Dundaff St., Carbondale, Pa.
Henkel-Clauss Co., The, Fremont, O.
Henry Valve Co., Melrose Park, Ill.
Henry & Wright, Div. of Embart Mfg. Co., 760 Windsor St., Hartford, Conn.
Her-Born Engineering & Mfg. Co., 212 Columbus Ave., Sandusky, O
Herbusch Corp., The, 706 Chestnut St., 210 Title Guaranty Bldg., St Louis 1, Mo.
Hercules Chemical Co., Inc., 332 Canal St., New York 13, N. Y.
Hercules Electric & Mfg. Co., Inc., 2500 Atlantic Ave., Brooklyn 7 N. Y.
Heremetal Co., 1310 Aldrich Ave., N. Minneapolis 11, Minn.
Heresite & Chemical Co., Manitowoc, Wis.
Hermon Hosmer Scott, Inc., 385 Putnam Ave., Cambridge 39, Mass
Hersey Mfg. Co., South Boston, Mass.
Hershey Machine & Foundry Co., Motorstokor Div., Manheim, Pa.
Hertner Electric Co., The, 12690 Elmwood Ave., Cleveland 11, O.
Hetzel Roofing Products Co., 67 Maine St., Newark 5, N. J.
Hexdall Co., A. M., Morris, Ill.
Highside Chemicals Co., 10 Colfax Ave., Clifton, N. J.
Hill Diesel Engine Corp., Lansing 3, Mich.
Hill, E. Vernon & Co., 6829 W. Highland Ave., Chicago 31, Ill.
Hills-McCanna Co., 3025 N. Western Ave., Chicago 18, Ill
Hilo Varnish Corp., Div. of Carpenter-Morton Co., 376 Third St., Everett 49, Mass.
Himelblau Associates, Inc., 5401 W. Harrison St., Chicago 44, Ill.
Hinde & Dauch Paper Co., P. O. Box 861, Sandusky, O.
Hinrichsen, Inc., A. F., 50 Church St., New York, N. Y.
Hirschman-Pohle Co., Inc., 12 Lent Ave., LeRoy, N. Y.
Hobart Bros., Co., Troy 1, O.
Hobsite Products Co., 308 Sussex St., Harrison, N. J.
Hodge Boiler Wks., 99-111 Sumner St., East Boston 28, Mass.
Hodgman Mfg. Co., 135 Washington St., Taunton, Mass.
Hoffman Specialty Mfg. Corp., 1001 York St., Indianapolis 7, Ind.
Hogan & Co., Inc., C. T., 383 Madison Ave., New York 17, N. Y
Holby Valve Co., 1146 Second Ave., New York 21, N. Y.
Holcomb & Hoke Mfg. Co., Inc., 1545 Van Buren, Indianapolis 7, Ind.
Holden Fan Co., 2503 Danforth, Detroit, Mich.
Hollands Mfg. Co., Erie, Pa.
Holsclaw Bros., Inc., 408 N. Willow Rd., Evansville 11, Ind.
Homease Products Division, 37 Kentucky Ave., Paterson 3, N. J.
Homestead Valve Mfg. Co., P. O. Box 348, Coraopolis, Pa.
Hood Refining Co., 182 N. Hamilton Ave., Greensburg, Pa.
Hook & Ackerman, Inc., 9 E. 40th St., New York 16, N. Y.
Hooper Engineering Co., 18215 Greydale, Detroit, Mich.
Hoover Co., The, Kingston-Conley Div., 68 Brook Ave., North Plainfield, N. J.
Hoppes Mfg. Co., Inc., 850 N. Belmont Ave., Springfield, O.
Horn Co., Inc., A. C., 10th St. & 44th Ave., Long Island City, N. Y.
Horton Mfg. Co., 3016 University Ave., S. E., Minneapolis 14, Minn.
Hossfeld Mfg. Co., 460 W. Third St., Winona, Minn.
Hotpoint Co., 5600 W. Taylor St., Chicago 44, Ill.
Hotstream Heater Co., 2363 E. 69th St., Cleveland 4, O.
Houghton & Co., E. F., 303 W. Lehigh Ave., Philadelphia 33, Pa.
Howard Iron Wks. & Alberger Heater Div., 287 Chicago St., Buffalo 4, N. Y.
Howe Ice Machine Co., 2825 Montrose Ave., Chicago 18, Ill.
Howell Electric Motors Co., Howell, Mich.
Howes-Woods Co., 201 Bridge St., Cambridge, Mass.
Hubbell Corp., P. O. Box 700, Hawley Rd., Mundelein, Ill.
Hudson Industries, Inc., 4400 St. Aubin Ave., Detroit 7, Mich.
Humboldt Mfg. Co., 2016 N. Whipple St., Chicago, Ill.
Hungerford & Terry, Inc., Clayton, N. J.
Hunt & Son, C. B., Inc., Salem, O.
Hunter Fan and Ventilating Co., Inc., 400 S. Front St., Memphis, Tenn.
Hupp Corp., Globe Stamping Div., 1250 W. 76th St., Cleveland 2, O.
Huron Boiler Co., 10457 Gratiot Ave., Detroit 13, Mich.
Hussey & Co., C. G., Div. of Copper Range Co., 2850 Second Ave., Pittsburgh 19, Pa.
Huyette Co., Inc., Paul B., 401 N. Broad St., Philadelphia 8, Pa.
Hyatt Bearings Div., General Motors Corp., Harrison, N. J.
Hynes Div., Rodman H. Martin Co., 1815 W. Sedgley Ave., Philadelphia 32, Pa.
Hypro Engineering Co., 440 N. Washington Ave., Minneapolis, Minn

I

Ideal Electric & Mfg. Co., E. First & Oak Sts., Mansfield, O.
Ideal Industries, Inc., 1096 Parke Ave., Sycamore, Ill.
Iden Associates, 1809 N. Milwaukee Ave., Chicago 47, Ill.
Ilg Electric Ventilating Co., 2841 N. Crawford Ave., Chicago 41, Ill.
Illinois Bronze Powder Co., 2015 S. Clark St., Chicago 16, Ill.
Illinois Engineering Co., Racine Ave. at 21st St., Chicago 8, Ill.
Illinois Malleable Iron Co., 1801 Diversey Parkway, Chicago 14, Ill.
Illinois Oil Products, Inc., 4th Ave. and 24th St., Rock Island, Ill.
Illinois Testing Laboratories, Inc., 420 N. La Salle St., Chicago 10, Ill.
Illinois Zinc Co., 2959 W. 47th St., Chicago 32, Ill.
Imperial Brass Mfg. Co., 1200 W. Harrison St., Chicago 7, Ill.
Imperial Electric Co., 64 Ira Ave., Akron, O.
Independent Pneumatic Tool Co., 175 N. State St., Aurora, Ill.
Independent Register Co., 3747 E. 93rd St., Cleveland 5, O.
Indiana Fan Company, 427 S. Alabama St., Indianapolis 4, Ind.
Industrial Acoustics Co., Inc., 333 Jackson Ave., New York 54, N. Y.
Industrial Engineered Products Co., 7416 Melrose Ave., Los Angeles 46, Calif.
Industrial Engineering Corp., Terre Haute, Ind.
Industrial Engineering & Equipment Co., 711 S. Theresa Ave., St. Louis 3, Mo.
Industrial Mfg. & Engineering Co., 3845 N. Ravenswood Ave., Chicago 13, Ill.
Industrial Metal Protectives, Inc., 401 Homestead Ave., Dayton 8, O
Industrial Screw Co., 711 W. Lake St., Chicago 6, Ill.
Industrial Service Laboratories, 7656 W. Forest Home Ave., Milwaukee 14, Wis.
Industrial Sound Control, Inc., 45 Granby St., Hartford 12, Conn.
Infra Insulation, Inc., 10 Murray St., New York, N. Y.
Ingersoll Products Div., Borg-Warner Corp., 310 S. Michigan Ave. Chicago 4, Ill.
Ingersoll-Rand Co., 11 Broadway, New York 4, N. Y.
Ingersoll Steel Div., Borg-Warner Corp., 310 S. Michigan Ave., Chicago 4, Ill.
Inland Steel Co., 38 S. Dearborn St., Chicago 3, Ill.
Inland Steel Products Co., P. O. Box 393, Milwaukee 1, Wis
Inner-Tite Div. of Yara Engineering Corp., 18 W. Jersey St., Elizabeth 4, N. J.
Instant Drying Corp., 101 Park Ave., New York, N. Y.
Insto-Gas Corp., 1977 E. Woodbridge St., Detroit 7, Mich.
Instruments, Inc., Wright Bldg., Tulsa, Okla.
Insulite Div. Minnesota and Ontario Paper Co., 500 Baker Arcade Bldg., Minneapolis 2, Minn.
Insul-Wool Insulation Corp., 121 N. Dodge, Wichita 12, Kans.
Inter-Coastal Paint Corp., 13th St. and Southern R. R., East St. Louis Ill.
Interchemical Corp., Finishes Div., 224 McWhorter St., Newark 1, N. J.
International Boiler Works Co., The, East Stroudsburg, Pa.
International Engineering, Inc., 1145 Bolander Ave., Dayton 1, O.
International Engineering Wks., Inc., Box 71, Framingham, Mass.
International Heater Co., 101 Park Ave., Utica 2, N. Y.
International Mfg. Co., 600 E. Grand Ave., Oklahoma City, Okla.
International Metal Products Co., Phoenix, Ariz.
International Nickel Co., Inc., The, 67 Wall St., New York 5, N. Y.
International Powder Metallurgy Inc., Ridgway, Pa.
International Register Co., 2624 W. Washington Blvd., Chicago 12, Ill
International Sales Co., 2045 Evans Ave. San Francisco 24, Calif.
International Steel Co., 1545 Edgar St., Evansville, Ind.

International Vermiculite Co., Girard, Ill.
Interstate Sales Co., 123 E. 18th St., New York 3, N. Y.
Iona Ventilator Co., Inc., 2821-29 W. Dauphin St., Philadelphia 32
Iron City Chemical Co., Glycolator Division, Valencia, Pa.
Iron Fireman Mfg. Co., 3170 W. 106 St., Cleveland 11, O.
Iron Lung Ventilator Co., 4019 Prospect Ave., Cleveland 3, O.
Irvington Varnish and Insulator Co., 6 Argyle Terrace, Irvington 11 N. J.
Isoflex Corp., 989 Folsom St., San Francisco 7, Calif.
Iwan Brothers, Inc., 1503 Prairie Ave., South Bend 14, Ind.

J

J O Mfg. Co., 8442 Otis St., South Gate, Calif.
Jabsco Pump Co., 2031 Lincoln St., Burbank, Calif.
Jack & Heintz, Inc., Cleveland 1, O.
Jackson & Church Co., 321 N. Hamilton Ave., Saginaw 65, Mich.
Jacobs Co., B. & J., 1729 John St., Cincinnati 14, O.
Jacuzzi Bros., Inc., 5327 Jacuzzi Ave., Richmond, Calif.
Jaden Mfg. Co., 1601 Second St., Hastings, Neb.
James-Pond-Clark, 2181 E. Foothill Blvd., Pasadena 8, Calif.
Jamieson Mfg. Co., 819 Bedford, Dallas, Tex.
Jan-Air, Inc., Richmond, Ill.
Janette Elect. Mfg. Co., Lehigh at Main, Morton Grove, Ill.
Jarecki Valve Div., H. K. Porter Co., Inc., Tulsa, Okla.
Jefferson Electric Co., 25th & Madison St., Bellwood, Ill.
Jefferson Union Co., 607 W. 26th St., New York 1, N. Y.
Jeffrey Mfg. Co., 859 N. Fourth St., Columbus 16, O.
Jenkins Bros., 100 Park Ave., New York 17, N. Y.
Jenn Air Products Co., 409 Architects Bldg., Indianapolis 4, Ind.
Jennison Co., 87 Putnam St., Fitchburg, Mass.
Jerry Finn Engineers, 634 Grand Ave., St. Paul 5, Minn.
Jessop Steel Co., Washington, Pa.
Jewel Mfg. Co., 1841 University Ave., St. Paul 4, Minn.
Johns-Manville, 22 E. 40th St., New York 16, N. Y.
Johnson Bronze Co., 460 S. Mill St., New Castle, Pa.
Johnson Co., S. T., 401 N. Broad St., Philadelphia 8, Pa.
Johuson Corp., The, 806 Wood St., Three Rivers, Mich.
Johnson Gas Appliance Co., 520 "E" Ave., N. W., Cedar Rapids, Ia.
Johnson Heater Corp., 1 Winnisimet St., Chelsea, Mass.
Johnson Machine Works, 619 Menomonie St., Eau Claire, Wis.
Johnson Mfg. Co., Inc., Mt. Vernon, Ia.
Johnson Metal Hose, Inc., 10 Sperry St., Waterbury 20, Conn.
Johnson Service Co., 507 E. Michigan St., Milwaukee 2, Wis.
Johnson-Williams Ltd., 2625 Third St., Palo Alto, Calif.
Johnston Bros., Inc., Ferrysburg, Mich.
Johnston & Chapman Co., 2925 Carroll Ave., Chicago 12, Ill.
Johnston & Jennings Co., 6917 Bessemer Ave., Cleveland 27, O.
Johnston Foil Mfg. Co., 6100 S. Broadway, St. Louis 11, Mo.
Jones Foundry & Machine Co., W. A., 4401 Roosevelt Rd., Chicago 24, Ill.
Jones & Laughlin Steel Corp., Third Ave. & Ross St., Pittsburgh 30, Pa.
Jordan & Co., Inc., Paul R., 311 E. South St., Indianapolis 4, Ind.
Jordan Regulator Corp., 109 W. Mulberry St., Lebanon, O.
Joy Mfg. Co., Dept. 20, Henry W. Oliver Bldg., Pittsburgh 22, Pa.
Justrite Mfg. Co., 2061 N. Southport Ave., Chicago, Ill.
Justus Steam Trap Co., Napanoch, N. Y.

K

Kainer & Co., 763 W. Lexington St., Chicago 7, Ill.
Kaiser Aluminum & Chemical Corp., 1924 Broadway, Oakland 12, Calif.
Kaiser Co., E. B., 625 Webster Ave., Chicago 14, Ill.
Kaiser Co., H. S., 3336 Franklin Blvd., Chicago, Ill.
Kane Mfg. Corp., Kane, Pa.
Kates Co., W. A., The, 430 Waukegan Rd., Deerfield, Ill.
Kauffman Air Conditioning Corp., 4505 Olive St., St. Louis 8, Mo.
Kaufman Co., H. J., The, 13215 Roselawn Ave., Detroit 4, Mich.
Kaul Clay Mfg. Co., The, Toronto, O.
Kaustine Co., Inc., 1492 Washington Ave., Perry, N. Y.
Kaye & McDonald, Inc., 11-15 Central Ave., West Orange, N. J.
Kaylo Div., Owens-Illinois Glass Co., Box 1035, Toledo 1, O.
Keasbey Co., Robert A., 139-149 W. 19th St., New York, N. Y.
Keasbey & Mattison Co., Butler Ave., Ambler, Pa.
Keckley Co., O. C., 400 W. Madison St., Chicago 6, Ill.
Keeler Co., E., 238 West St., Williamsport 3, Pa.
Keeney Mfg. Co., Main St., Newington 11, Conn.
Kehm Corp., The, 135 S. La Salle St., Chicago 3, Ill.
Keller Tool Co., P. O. Box 268, Grand Haven, Mich.
Kellogg Co., M. W., The, 225 Broadway, New York 7, N. Y.
Kelley Koett Mfg. Co., The, 212 W. 4th St., Covington, Ky.
Kelvinator Div., Nash-Kelvinator Corp., 14250 Plymouth Rd., Detroit 32, Mich.
Kemp Mfg. Co., C. M., 405 E. Oliver St., Baltimore, Md.
Kenco, Inc., 1125 North Ridge Rd., Lorain, O.
Kenite Laboratory, Inc., 100 Kings Rd., P. O. Box 268, Madison, N. J.
Kennard Corp., 1819 S. Hanley Rd., St. Louis 17, Mo.
Kennedy Valve Mfg. Co., The, Elmira, N. Y.
Kenney Co., L. C., 2300 W. 59th St., Chicago 36, Ill.
Kensico Tube Co., Mt. Kisco, N. Y.
Kerentoff, G. L., 2218 Reading Rd., Cincinnati 2, O.
Kern Co., John A., 224 N. Loomis St., Chicago 7, Ill.
Kerotest Mfg. Co., 2525 Liberty Ave., Pittsburgh 22, Pa.
Kester Solder Co., 4201 Wrightwood Ave., Chicago 39, Ill.
Kewanee-Ross Corp., 101 Franklin St., Kewanee, Ill.
Kewaunee Mfg. Co., Adrian, Mich.
Key Co., 2617 McCasland, East St. Louis, Ill.
Keystone Asphalt Products Co., 101 E. Ontario St., Chicago 11, Ill.
Keystone Carbon Co., Inc., 1935 State St., St. Marys, Pa.
Kidder Mfg. Co., Inc., J. F., 426 Colchester Ave., Burlington, Vt.
Kieley & Mueller, Inc., 2015 43rd St., North Bergen, N. J.
Kilbury Mfg. Co., Inc., 14529 Hawthorne Blvd., Lawndale, Calif.
Kilgore Mfg. Co., Westerville, O.
Kimberly-Clark Corp., Neenah, Wis.
Kindl-Air Corp., 1480 W. 112th St., Cleveland, Ohio
King Co., The, 928 N. Cedar St., Owatonna, Minn.
King Engineering Corp., 945 Willard Ave., Ann Arbor, Mich.
King Union Co., Inc., Hillsgrove, R. I.
Kingsford Foundry & Machine Wks., 264 W. Second St., Oswego, N. Y.
Kingston Products Corp., 1415 N. Webster, Kokomo, Ind.
Kinney Mfg. Co., 3529 Washington St., Boston 30, Mass.
Kirk & Blum Mfg. Co., 3120 Forrer St., Cincinnati 9, O.
Kisco Boiler & Engineering Co., 2414 Dekalb St., St. Louis 4, Mo.
Klauer Mfg. Co., 9th and Washington Sts., Dubuque, Ia.
Kleenaire Corp., 409 Jefferson St., Stevens Point, Wis.
Kleen-Heet, Inc., 1823 Carroll Ave., Chicago 12, Ill.
Klenk's Aviation Snips, 107 E. 5th St., Wilmington, Del.
Kling Bros., Engineering Works, 1320 N. Kostner Ave., Chicago 51, Ill.
Klipfel Valves, Inc., 1075 Lincoln Ave., Hamilton, O.
Kluegel & Co., E., 187 W. Kellogg Blvd., St. Paul, Minn.
Knapp Bros. Mfg. Co., Inc., 16 East 72nd St., Cincinnati 16, O.
Knight, Maurice A., Kelly Ave., Akron 9, O.
Knowles Mushroom Ventilator Co., 583 Upper Mountain Ave., Upper Montclair, N. J.
Knuth Engineering Co., 2617 N. St. Louis, Chicago, Ill.
Kobe Inc., Div. of Dresser Equipment Co., Huntington Park, Calif.
Kol-Master Corp., 161 Walberg St., Oregon, Ill.
Kold-Hold Mfg. Co., Lansing 4, Mich.
Kool-Kar Co., Inc., 1468 Penobscot Bldg., Detroit, Mich.
Kool-Sleep, Inc., Cambridge, O.
Kopperman & Sons, Joseph, 316 New St., Philadelphia 6, Pa.
Koppers Co., Inc., Koppers Bldg., Pittsburgh 19, Pa.
Koppers Co., Inc., Metal Products Div., 200 Scott St., Baltimore 3, Md.
Korfund Co., Inc., 48-01-F 32nd Pl., Long Island City 1, N. Y.
Koven & Bro., L. O., Inc., 154 Ogden Ave., Jersey City 7, N. J.
Kraissl Co., Inc., The, Terhune and Williams Aves., Hackensack, N. J.
Kramer Trenton Co., N. Olden & Breunig Aves., Trenton 5, N. J.
Kraus Co., Walter S., 48-02 43rd St., Woodside 77, N. Y.
Krauser-Boyd, Inc., North Tonawanda, N. Y.
Krehbiel Co., J. H., 425 N. Crawford Ave., Chicago, Ill.
Kritzer Radiant Coils, Inc., 2901 W. Lawrence Ave., Chicago 25, Ill.
Krueger Air Conditioning Co., 19 E. Rillito St., Tucson, Ariz.
Krueger Sentry Gauge Co., 1056 W. Mason St., Green Bay, Wis.
Kuhns Bros. Co., 1800 McCall St., Dayton 8, O.
Kunkle Valve Co., 121 S. Clinton St., Ft. Wayne 2, Ind.
Kwikon Co., 1850 W. Washington, Chicago 12, Ill.
Kynex Co., 21 West St., New York 6, N. Y.

L

LaBour Co., Inc., The, 1301 Sterling Ave., Elkhart, Ind.
Laclede-Christy Co., Arcade Bldg., St. Louis 1, Mo.
Laclede Steel Co., Arcade Bldg., Rm. 1317, St. Louis 1, Mo.
Laclede Stoker Co., 4438 Hunt Ave., St. Louis 10, Mo.
La Crosse Steel Roofing & Corrugating Co., 227 Jay St., La Crosse, Wis.
Ladish Co., 5300 S. Packard Ave., Cudahy, Wis. (Milwaukee Suburb).
LaHarco Industries, 721-2nd Ave., N., Minneapolis 5, Minn.
Lake Chemical Co., 3052 W. Carroll Ave., Chicago 12, Ill.
Lamb Electric Co., Kent, O.
Lammert & Mann Co., Wood & Walnut Sts., Chicago 12, Ill.
Lamson Corp., Blower Div., Syracuse 1, N. Y.
Lamson & Sessions Co., 1971 W. 85th St., Cleveland, O.
Lancaster Heat Transfer Co., Inc., 123 DeKalb Ave., Brooklyn, N. Y.
Landis & Gyr, Inc., 45 W. 45th St., New York 36, N. Y.
Landis Machine Co., Inc., Fifth and Church Sts., Waynesboro, Pa.
Lane Shur-Grip Tool Co., 1420 S. Michigan Ave., Chicago 5, Ill.
Larkin Packer Co., 6200 Maple Ave., St. Louis 14, Mo.
Larkin Coils, Inc., 519 Memorial Dr., S. E., Atlanta 1, Ga.
Lastik Products Co., Inc., 203 Iroquois Bldg., Pittsburgh 13, Pa.
Lattner Mfg. Co., P. M., 1411-9th St., N. W., Cedar Rapids, Iowa
Lau Blower Co., 2001 Home Ave., Dayton 7, O.
Lawler Automatic Controls, Inc., 453 N. MacQuesten Pkwy., Mount Vernon, N. Y.
Lawrence Pump & Engine Co., P. O. Box 70, Lawrence, Mass.
Layne & Bowler, Inc., Box No. 6697, Hollywood Sta., Memphis 8, Tenn.
Leach Relay Co., 5919 Avalon Blvd., Los Angeles 3, Calif.
Lead Lined Iron Pipe Co., 1 Broadway, Wakefield, Mass.
Leahy Mfg. Co., Los Angeles, Calif.
Leavitt Machine Co., East River St., Orange, Mass.
Lecourtenay Co., 5 Maine St., Newark 5, N. J.
Ledeen Mfg. Co., 1602 S. San Pedro St., Los Angeles 15, Calif.
Lee Co., K. O., Aberdeen, S. D.
Lee Corp., 1011 Tatnall St., Wilmington, Del.
Lee-Don, Inc., Box 556, Harmarville, Pa.
Lee & Son, Thomas, 128-132 W. Second St., Cincinnati 2, O.
Lee Vine Fin-Tube Radiator Co., Inc., 10 Fair St., New Haven, Conn.
Leeds & Northrup Co., 4970 Stenton Ave., Philadelphia 44, Pa.
Lees, John, Div., The, Serrick Corp., Batavia St. and Kilgore Ave., Muncie, Ind.

Leffel & Co., James, 426 East St., Springfield, O.
Lehigh Fan & Blower Co., 17th and Sumner Ave., Allentown, Pa.
Lehigh Mfg. Co., Div. of Lehigh Foundries, Inc., Lancaster, Pa.
Leibfried Mfg. Corp., C. H., 95 Guernsey, Brooklyn, N. Y.
Leiman Bros., Inc., 163 W. Christie St., Newark, N. J.
Leinweber Aluminum Nozzles, 8448 Crandon, Chicago, Ill.
Leland Electric Co., The, Div. of American Machine & Foundry Co., 1501 Webster St., Dayton 1, O.
Lenk Mfg. Co., 30 Cummington St., Boston 15, Mass.
Lennox Furnace Co., Marshalltown, Ia.
Leonard Valve Co., 1360 Elmwood Ave., Cranston 9, R. I.
Leslie Co., 237 Grant Ave., Lyndhurst, N. J.
Leslie Welding Co., Inc., 2943 Carroll Ave., Chicago 12, Ill.
Levow, David, 308 W. 20th St., New York 11, N. Y.
Lewellen Mfg. Co., Columbus, Ind.
Lewin-Mathes Co., Lewin Metals Div., 1111 Chouteau Ave., St. Louis 2, Mo.
Lewis & Co., Inc., Chas. S., 2207 Pine St., St. Louis 3, Mo.
Lewis & Co., Joseph E., 1319 Carroll St., Baltimore, Md.
Leyman Mfg. Corp., John H. McGowan Co. Div., 1416 First National Bank Bldg., Cincinnati 2, O.
Libbey-Owens-Ford Glass Co., Nicholas Bldg., Toledo 3, O.
Libert Machine Co., 324 N. Roosevelt St., Green Bay, Wis.
Lieblich Oil Burner Inc., 36 W. 66th St., New York, N. Y.
Lientz Co., B. P., P. O. Box 2275, Kansas City, Mo.
Lilie-Hoffmann Cooling Towers, Inc., 4239 Duncan Ave., St. Louis 10, Mo.
Lima Electric Motor Co., The, Lima, O.
Lima Register Co., The, 651 N. Baxter St., Lima, O.
Lincoln Electric Co., The, 22801 St. Clair Ave., Cleveland 17, O.
Linde Air Products Co., A Div. of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
Lindsay Structure, Inc., 5000 W. Dempster St., Skokie, Ill.
Lindy Heaters, Inc., 2370 Hoffman St., New York 57, N. Y.
Linear Incorporated, N. W. Cor. State Rd. & Levick St., Philadelphia 35, Pa.
Link-Belt Co., 307 N. Michigan Ave., Chicago 1; 300 W. Pershing Rd., Chicago 9, Ill., 519 N. Holmes Ave. and 220 S. Belmont Ave., Indianapolis 6, Ind., 2045 W. Hunting Park Ave., Philadelphia 40, Pa.
Lintern Corp., Route 20 East, Painesville, O.
Lipman Refrigeration Div., Yates-American Co., Beloit, Wis.
Liquid Carbonic Corp., 3100 S. Kedzie Ave., Chicago 23, Ill.
Liquid Carbonic Corp., Industrial Gas Div., 3100 S. Kedzie Ave., Chicago 23, Ill.
Liquidepth Indicators, Inc., 43-22 Tenth St., Long Island City 1, N. Y.
Liquidometer Corp., 37-15 Skillman Ave., Long Island City 1, N. Y.
Lissberger & Son, Inc., Marks, 23-01 Borden Ave., Long Island City, N. Y.
Lithcote Corp., 333 W. 40th Pl., Chicago 9, Ill.
Little Giant Vaporizer Co., Inc., 5105 Classen Blvd., P. O. Box 3535, Oklahoma City 6, Okla.
Little Mfg. Co., M. S., 151 New Park Ave., Hartford 6, Conn.
Littleford Bros., Inc., 453 E. Pearl St., Cincinnati 2, O.
Livingstone Engineering Co., 100 Grove St., Worcester 5, Mass.
Locke Regulator Co., Walter and Osborne Sts., Salem, Mass.
Lockformer Co., The, 4615 W. Roosevelt Rd., Chicago 50, Ill.
Lockjoint Wood Products Co., 1114 S. Sante Fe, Wichita 11, Kan.
Locknut Corp. of America, 3403 W. 47th St., Chicago 32, Ill.
Lockport Cotton Batting Co., Lockport, N. Y.
Logan Clay Products Co., The, Logan, O.
Logan Engineering Co., Lawrence & Lamon Ave., Chicago 30, Ill.
London Chemical Co., 325 W. 32nd St., Chicago, Ill.
Lonergan Co., J. E., 2nd and Race Sts., Philadelphia 6, Pa.
Lonergan Mfg. Co., Edison & Clark Sts., Albion, Mich.
Lookout Boiler & Mfg. Co., Compress St. & Mfrs. Rd., Chattanooga 1, Tenn.
Lord Mfg. Co., 1635 W. 12th St., Erie, Pa.
Lord & Clark Co., Inc., 69 Tencan St., Boston 22, Mass.
Louisville Drying Machinery Unit, General American Transportation Corp., 139 So. 4th St., Louisville 2, Ky.
Louvra Corp., The, 1010 Jeanette Ave., Union, N. J.
Lovejoy Flexible Coupling Co., 5081 W. Lake St., Chicago 44, Ill.
Lowell Wrench Co., 54 Commercial St., Worcester 8, Mass.
Loyal Knight Stokers, Inc., 800 Scheel St., Belleville, Ill.
Ludlow Valve Mfg. Co., Inc., Foot of Adams St., Troy, N. Y.
Lufkin Rule Co., Saginaw, Mich.
Lug-All Co., The, Wynnewood 29, Pa.
Lukens Steel Co. and Divisions, 308 S. First Ave., Coatesville, Pa.
Lumm Co., A. H., 2512 Albion St., Toledo 6, O.
Lumsden & Van Stone, Div. of Midwest Piping & Supply Co., 426 First St., South Boston 27, Mass.
Lunkenheimer Co., Waverly & Beekman Sts., Cincinnati 14, O.
Lurie & Lurie, 126 N. Union St., Chicago, Ill.
Lustra Corp. of America, 36 Washington St., Brooklyn, N. Y.
Luzerne Rubber Co., Muirhead Ave., Trenton 9, N. J.
Lynch Asbestos Co., 2939 So. Sunol Drive, Los Angeles 23, Calif.
Lynch Mfg. Corp., 3600 Summit St., Toledo 1, O.
Lynchburg Foundry Co., Peoples Bank Bldg., Lynchburg, Va.
Lyon, Conklin & Co., Inc., McComas & Race Sts., Baltimore 30, Md

M

M B Mfg. Co., Inc., The, 1060 State St., New Haven 11, Conn.
M & E Mfg. Co., 2757 Winthrop Ave., Indianapolis, Ind.
M-M-A, Inc., Wabank Rd., Lancaster, Pa.
Maas & Waldstein Co., 2121 McCarter Highway, Newark 4, N. J.
MacDermid Chemical Co., Box 1041, Bristol, Conn.
Macksons Co., 125 Cedar St., New York 6, N. Y.
Madden Corp., The, 1543 Morse Ave., Chicago, Ill.
Madden Brass Products Co., 1111 N. Franklin St., Chicago 10, Ill.
Mac-Lean-Fogg Lock Nut Co., 5535 N. Wolcott Ave., Chicago 40, Ill.
Magic Chef, Inc., 1641 S. Kingshighway Blvd., St. Louis 10, Mo.
MaGirl Foundry & Furnace Co., 413 E. Oakland Ave., Bloomington, Ill.
Magnetrol, Inc., 2110 S. Marshall Blvd., Chicago 23, Ill.
MagniLastic Div., Cook Electric Co., 2700 Southport Ave., Chicago 14, Ill.
Magnode Products, Inc., Box 292, Trenton, O.
Magnus Chemical Co., South Ave., Garwood, N. J.
Mahon Co., R. C., The, P. O. Box 4666, Detroit 34, Mich.
Mahr Mfg. Co., Div. of Diamond Iron Wks., Inc., 1728 Second St. N., Minneapolis 11, Minn.
Maid-O'-Mist, Inc., 3217 N. Pulaski Rd., Chicago 41, Ill.
Maintenance Engineering Corp., 3611 Clinton Dr., Houston, Tex.
Majot Automatic Machine Co., Inc., 88 Main St., East Orange, N. J.
Mall Tool Co., 7740 South Chicago Ave., Chicago 19, Ill.
Malleable Iron Fittings Co., Branford, Conn.
Mallory Sales Co., 13904 Lincoln Ave., Dolton, Ill.
Manhattan Perforated Metal Co., Inc., 43-17 37th St., Long Island City 1, N. Y.
Manheim Mfg. & Belting Co., Manheim, Pa.
Manitowoc Shipbuilding, Inc., 16th & The River, Manitowoc, Wis.
Manning & Lewis Engineering Co., Newark, N. J.
Manning, Maxwell & Moore, Inc., 250 East Main St., Stratford, Conn.
Mansfield & Green, 1051 Power Ave., Cleveland 14, O.
Manufacturers Machine Co., Railroad Ave., North Andover, Mass.
Maplewood Machinery Co., Inc., 2634 Fullerton Ave., Chicago 47, Ill.
Marathon Electric Mfg. Corp., Cherry and Randolph Sts., P. O. Box 630, Wausau, Wis.
Marble-Card Electric Co., Gladstone, Mich.
Marco Co., Inc., 3rd & Church Sts., Wilmington 50, Del.
Marco Industries, Inc., 786 Terrace Blvd., Depew, N. Y.
Marine & Industrial Products Co., 3731 Filbert St., Philadelphia 4, Pa.
Marion Machine Foundry & Supply Co., Marion, Ind.
Markal Co., 3052 W. Carroll Ave., Chicago 12, Ill.
Marley Co., Inc., The, 222 West Gregory Blvd., Kansas City 5, Mo.
Marlin-Rockwell Corp., Jamestown, N. Y.
Marlo Coil Co., 6135 Manchester Rd., St. Louis 10, Mo.
Marlow Pumps, Ridgewood, N. J.
Marman Products Co., Inc., 11214 Exposition Blvd., Los Angeles 64, Calif.
Marquart Mfg. Co., 1241 High St., Oakland 1, Calif.
Marquette Mfg. Co., 307 E. Hennepin Ave., Minneapolis 14, Minn.
Marsh Heating Equipment Co., 3501 Howard St., Skokie, Ill.
Marsh Valve Co., 4th St., & Brigham Rd., Dunkirk, N. Y.
Marshalltown Mfg. Co., 901 E. Nevada, Marshalltown, Ia.
Martens & Stormoen, 15 Hathaway St., Boston 10, Mass.
Martin Co., Inc., J. O., 637 Minna St., San Francisco 3, Calif.
Martin Fan & Blower Co., 4634 W. 21st Pl., Chicago 50, Ill.
Martin & Sons, H. P., 801 W. 12th St., Owensboro, Ky.
Martin Metal Products Corp., Ferndale, Mich.
Martocello & Co., Jos. A., 229 N. 13th St., Philadelphia 7, Pa.
Marvel Engineering Co., 625 W. Jackson Blvd., Chicago, Ill.
Masonite Corp., 111 W. Washington St., Chicago 2, Ill.
Mason-Neilan Regulator Co., 1190 Adams St., Boston 24, Mass.
Mass Co., 1123 W. 4½ St., Davenport, Ia.
Master Control Co., The, 2034 Fifth St., Cuyahoga Falls, O.
Master Craft Products, 95-01 150th St., Jamaica 4, N. Y.
Master Electric Co., 126 Davis Ave., Dayton 1, O.
Master Mechanics Co., 2097 Columbus, Cleveland, O.
Matthiessen & Hegeler Zinc Co., 9th & Sterling Sts., La Salle, Ill.
Maurath, Inc., 21800 Miles Ave., Cleveland 22, O.
Maurey Mfg. Corp., 2911 S. Wabash Ave., Chicago 16, Ill.
May Oil Burner Div., May Fuel Oil Corp., 1500 Russell St., Baltimore 30, Md.
Mayer Refrigerating Engineers, Inc., Rutherford, N. J.
Mayne Products Co., 324 Harries Bldg., Dayton 2, O.
Mayson Mfg. Co., 4332 Horatio St., Detroit 10, Mich.
Maysteel Products, Inc., 740 N. Plaukinton, Milwaukee 3, Wis.
McAlear Mfg. Co., 1921 S. Western Ave., Chicago 8, Ill.
McAuley Trap Co., 104 First Ave., Pittsburgh 22, Pa.
McCord Corp., 2587 E. Grand Blvd., Detroit 11, Mich.
McCorkle Co., D. H., 6th & Bancroft Way, Berkeley 2, Calif.
McDonnell & Miller, Inc., 3500 N. Spaulding Ave., Chicago 18, Ill.
McGraw Electric Co., Clark Div., 5201 W. 65th St., Chicago 28, Ill.
McIntire Connector Co., 263 Jefferson St., Newark 5, N. J.
McKay Co., 1005 Liberty Ave., Pittsburgh 22, Pa.
McLarty Systems, 2600 Dickman Rd., Battle Creek, Mich.
McLeod & Henry Co., Inc., Troy, N. Y.
McNeill Engineering Co., 4057 W. Van Buren St., Chicago 24, Ill.
McPherson Furnace & Supply Co., 1805 N. E. Second Ave., Portland 12, Ore
McQuay, Inc., 1600 Broadway, N. E., Minneapolis 13, Minn.
McQuay-Norris Mfg. Co., Southwest Ave. at Marconi, St. Louis 10, Mo
McRae Valve Co., 621 S. Spring St., Los Angeles 14, Calif.
McRay Products Co., 950 Mission St., South Pasadena 1, Calif.
McWane Cast Iron Pipe Co., 1201 Vanderbilt Rd., Birmingham 2, Ala.
Mears-Kane-Ofeldt, Inc., Div. S. T. Johnson Co., P. O. Box 223, Bridgeport, Pa.
Mechanical Industries Production Co., 217-223 Ash St., Akron 2, O.
Mechanical Products Corp., 168 N. Ogden Ave., Chicago 7, Ill.

Meco, Inc., 4101 S. E. 26th Ave., Portland 2, Ore.
Medart Co., 100 Potomac St., St. Louis 18, Mo.
Mefco Mfg. Co., Air Conditioning Div., 1505 Gardena Ave., Glendale 4, Calif.
Meier Electric & Machine Co., Inc., 3525 E. Washington St., Indianapolis 7, Ind.
Mel-Gauge Co., Crest Ave., East Haven, Conn.
Mel Products Co., The, 554 Chapel St., New Haven, Conn.
Meldon Industries Div., Tool Industries, Inc., 15438 Telegraph Rd., Detroit, Mich.
Menardi & Co., 1222 E. Grand Ave., El Segundo, Calif.
Merchant & Evans Co., 2035 Washington Ave., Philadelphia 46, Pa.
Mercoid Corp., The, 4201 Belmont Ave., Chicago 41, Ill.
Mercury Clutch Div., Automatic Steel Products, Inc., Canton 6, O.
Meriam Instrument Co., The, 10920 Madison Ave., Cleveland 2, O.
Mesker Steel Corp., Geo. L., 400 N. W. First St., Evansville 8, Ind.
Metalcraft Inc., Mason City, Ia.
Metal Fabricators, Inc., P. O. Box 3232, Charlotte 3, N. C.
Metal & Thermit Corp., 100 E. 42nd St., New York 17, N. Y.
Metallo Gasket Co., 16 Bethany St., New Brunswick, N. J.
Metropolitan Refining Co., Inc., 50-23 Twenty-Third St., Long Island City 1, N. Y.
Mettler Co., Inc., The, 4366 Worth St., Los Angeles 16, Calif.
Meyer & Bro. Co., F., 308 S. Commercial St., Peoria 2, Ill.
Meyer Furnace Co., The, P. O. Box 989, Peoria 1, Ill.
Meyer & Wenthe, Inc., 30 S. Jefferson St., Chicago, Ill.
Michigan Pipe Co., 506 Phoenix Bldg., Bay City, Mich.
Micro Metallic Corp., 30 Sea Cliff Ave., Glen Cove, N. Y.
Micro Products Co., 20 N. Wacker Dr., Chicago 6, Ill.
Micro Div. of Minneapolis-Honeywell Regulator Co., 1 E. Spring St., Freeport, Ill.
Midco Register Corp., 1059 Grand Ave., St. Paul, Minn.
Mid-Continent Metal Products Co., 1960 Clybourn Ave., Chicago 14, Ill.
Midland Paint & Varnish Co., 3802 E. 91st St., Cleveland 5, O.
Mid-States Welder Mfg. Co., 6025 S. Ashland Ave., Chicago 36, Ill.
Midwest Automatic Control Co., 510 Third St., Des Moines, Ia.
Midwest Piping & Supply Co., Inc., 1415 S. Second St., St. Louis 4, Mo.
Midwest Products Co., Port Byron, Ill.
Miller Electric Mfg. Co., Inc., 718 S. Bounds St., Appleton, Wis.
Miller-Harris Instrument Co., 601 E. Ogden Ave., Milwaukee 2, Wis.
Millers Falls Co., 57 Wells St., Greenfield, Mass.
Mill-Rose Co., 1985 E. 59th St., Cleveland, O.
Mills Corp., Elmer E., 2930 N. Ashland Ave., Chicago 13, Ill.
Mills Industries, Inc., 4100 W. Fullerton Ave., Chicago 39, Ill.
Milton Equipment Co., N. E. Cor. 4th Race St., Philadelphia 6, Pa.
Milton Roy Co., 1371 E. Mermaid Ave., Philadelphia 18, Pa.
Milwaukee Electric Tool Corp., 5316 W. State St., Milwaukee 8, Wis.
Milwaukee Gas Specialty Co., P. O. Box 461, Milwaukee, Wis.
Milwaukee Valve Co., S. Burrell St. at E. Hayes Ave., Milwaukee 7, Wis.
Mine Safety Appliances Co., 201 N. Braddock Ave., Pittsburgh 8, Pa.
Mineral Insulation Co., 103rd & Southwest Highway, Chicago Ridge, Ill.
Minerallac Electric Co., 25 N. Peoria St., Chicago 7, Ill.
Minneapolis-Honeywell Regulator Co., 2641 4th Ave., S., Minneapolis 8, Minn.
Minneapolis-Honeywell Regulator Co., Industrial Div., Wayne & Windrim Aves., Philadelphia 44, Pa.
Minnesota Mining & Mfg. Co., 900 Fauquier Ave., St. Paul, Minn.
Minn-Kota Foundry & Mfg. Co., P. O. Box 822, Fargo, N. D.
Miracle Adhesives Corp., 214 E. 53rd St., New York 22, N. Y.
Mir-O-Col Alloy Co., Inc., 312 North Ave., 21, Los Angeles 31, Calif.
Misener Mfg. Co., Inc., 200 8 Walton St., Syracuse 2, N. Y.
Mission Appliance Corp., 12611 Crenshaw Blvd., Hawthorne, Calif.
Mississippi Glass Co., 200 Fifth Ave., New York 10, N. Y.
Mitchell Co., John E., 3800 Commerce St., Dallas, Tex.
Mitchell & Co., Inc., W. K., 29th & Ellsworth, Philadelphia 46, Pa
Mitchell Mfg. Co., 2525 N. Clybourn Ave., Chicago, Ill.
Modern Engineering Co., 3411 Pine Blvd., St. Louis 3, Mo.
Modine Mfg. Co., 1509 De Koven Ave., Racine, Wis.
Moeller Instrument Co., 132nd St. & 89th Ave., Richmond Hill 18, N. Y.
Moeschl-Edwards Corrugating Co., Inc., The, P. O. Box 1115, Cincinnati 1, O.
Monarch Mfg. Works, Inc., 2501 E. Ontario St., Philadelphia 34, Pa
Monash-Younker Co., Inc., 1315 W. Congress St., Chicago 7, Ill.
Moncrief Furnace Co., P. O. Box 1673, Atlanta 1, Ga.
Monitor Controller Co., The, 51 Hayward St., Boston 84, Mass.
Monogram Products Co., Inc., 731 N. 35th St., Philadelphia 4, Pa.
Monsanto Chemical Co., 800 N. 12th Blvd., St. Louis 1, Mo.
Monsanto Chemical Co., Merimac Div., Everett Sta., Boston 49, Mass.
Montag Stove & Furnace Wks., 2011 N. Columbia Blvd., Portland 3, Ore.
Montgomery Bros., 1122 Howard St., San Francisco, Calif.
Moore Inc., Goodloe E., 2811 N. Vermilion, Danville, Ill.
Moore Co., The, 810 S. Missouri, Marceline, Mo.
Moore Products Co., H and Lycoming Sts., Philadelphia 24, Pa.
Moraine Products Div., General Motors Corp., Dayton 1, O.
Moran Flexible Joint Co., Inc., 217 W. Main St., Louisville, Ky.
Morehead Mfg. Co., 2455 W. Warren Ave., Detroit 8, Mich.
Moreheat Distribution Inc., 5608 Stewart Rd., Cincinnati 27, O.
Morey, Dan, Box 85, Los Angeles 35, Calif.
Morganite, Inc., Carbon Specialties Div., 3304 48th Ave., Long Island City 1, N. Y.
Morheat Corp., 700 E. Kalamazoo, Lansing, Mich.
Morris Coupling & Clamp Co., 12th and Factory Ave., Elwood City, Pa.
Morris Machine Wks., 50 E. Genesee St., Baldwinsville, N. Y.
Morrison Brothers Co., Dubuque, Ia.
Morrison Products, Inc., E. 168th St. and Waterloo Rd., Cleveland 10, O.
Morse Chain Co., 7601 Central Ave., Detroit 10, Mich.
Morse-Smith-Morse Co., The, 165 Dexter Ave., Watertown 72, Mass.
Mottell Co., J. W., Kankakee, Ill.
Motionair Co., 3319 E. Slauson Blvd., Los Angeles 11, Calif.
Mt. Hawley Mfg. Co., Inc., Mt. Hawley Air Port, Peoria 4, Ill.
Mountain States Equipment Co., 1238 Speer Blvd., Denver 4, Colo.
Muckle Mfg. Co., Owatonna 3, Minn.
Mueller Brass Co., Port Huron 1, Mich.
Mueller Co., 512 W. Cerro Gordo St., Decatur, Ill.
Mueller Furnace Co., L. J., 2005 W. Oklahoma Ave., Milwaukee 15, Wis.
Mueller Steam Specialty Co., Inc., 40-20 22nd St., Long Island City 1, N. Y.
Multi-Cell Sales Corp., 3420 Nicollet Ave., Minneapolis 8, Minn.
Multiplex Mfg. Co., Berwick, Pa.
Multi-Vent Div., Pyle-National Co., The, 1373 Kostner Ave., Chicago 51, Ill.
Muncie Gear Wks., Inc., 700 N. Wysor, Muncie, Ind.
Mund Boilers, Inc., 1600 N. Indiana St., Los Angeles 63, Calif.
Mundet Cork Corp., 7101 Tonnelle Ave., North Bergen, N. J.
Mundt & Sons, Charles, 53 Fairmount Ave., Jersey City 4, N. J.
Munn & Steele, Inc., Castle Island Terminal, South Boston, Mass.
Munton Mfg. Co., 9400 Belmont Ave., Franklin Park, Ill.
Muntz T V, Inc., 3150 N. Lincoln, Chicago, Ill.
Murray Co. of Texas, The, 3200 Canton Ave., Dallas, Tex.
Murray Iron Wks. Co., 1106 Washington St., Burlington, Ia.
Murray Mfg. Co., D. J., 1002-24 Third St., Wausau, Wis.
Myers & Bro. Co., F. E., The, Ashland, O.
Myers Electric Co., Inc., 209 First Ave., Pittsburgh 22, Pa.
Mystik Adhesive Products, Div. of Chicago Show Printing Co., 2635 N. Kildare Ave., Chicago 39, Ill.

N

Nash Engineering Co., 307 Wilson Ave., South Norwalk, Conn.
Nason Co., Clarkston, Mich.
Nat Corp., 2710 McGee St., Kansas City 8, Mo.
National Acme Co., The, 170 E. 131st St., Cleveland 8, O.
National Air Conditioning Inc., Johnstown, Pa.
National Airoil Burner Co., Inc., 1330 E. Sedgley Ave., Philadelphia 34, Pa.
National Aluminate Corp., 6215 W. 66th Pl., Chicago 38, Ill.
National Aniline Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
National Carbon Co., Div. of Union Carbide & Carbon Corp., 30 E. 42nd St., New York 17, N. Y.
National Cork Co., 1 Engle Street, Englewood, N. J.
National Cylinder Gas Co., 840 N. Michigan Ave., Chicago 11, Ill
National Engineering & Mfg. Co., 519 Wyandotte, Kansas City 6, Mo.
National Engineering Products, Inc., Commerce and Savings Bldg., Washington, D. C.
National Gas Equipment Co., Inc., Terrell, Tex.
National Gypsum Co., Delaware Ave., Buffalo, N. Y.
National Heater Co., 2182 Cleora Ave., St. Paul 4, Minn.
National Lead Co., 111 Broadway, New York 6, N. Y.
National Lock Co., Inc., 1902 Seventh St., Rockford, Ill.
National Metal Fabricators, 2138 S. Sawyer, Chicago 23, Ill.
National Meter Co., 4221 First Ave., Brooklyn 32, N. Y.
National Oil Burner Co. of N. Y. Inc., 614 Bergen St., Brooklyn, N. Y.
National Pipe Bending Co., 122 River St., New Haven 13, Conn.
National Pipe Coatings, Inc., 3480 East Randolph St., Huntington Park, Calif.
National Radiator Co., The, 221 Central Ave., Johnstown, Pa.
National Sheet Metal Works, New York, N. Y.
National Steam Pump Co., 701 W. Johnson St., Upper Sandusky, O.
National Time & Signal Corp., 21800 Wyoming Ave., Detroit 20, Mich.
National Tube Div., United States Steel Co., 525 William Penn Place, Pittsburgh 30, Pa.
National Valve & Mfg. Co., 3101 Liberty Ave., Pittsburgh 1, Pa.
National Water Lift Inc., Kalamazoo, Mich.
Naugatuck Mfg. Co., Union City, Conn.
Naylor Pipe Co., 1251 E. 92nd St., Chicago 19, Ill.
Nebel Mfg. Co., P. O. Box 3942, Shaker Square Sta., Cleveland 20, O.
Nelson Chemical Pumps, Box 2235, Casper, Wyo.
Nelson, Herman, Products, American Air Filter Co., Inc., 215 Central Ave., Louisville 8, Ky.
Nelson Mfg. Co., B. F., 401 Main St., N. E., Minneapolis 13, Minn.
Nelson Stud Welding, Gregory Industries, Inc., Lorain, O.
Neptune Meter Co., 50 W. 50th St., New York 20, N. Y.
Nesbitt, Inc., John J., State Rd. & Rhawn St., Philadelphia 36, Pa
Nevinger Mfg. Co., Inc., Greenville, Ill.
New Albany Machine Mfg. Co., E. 10th & Water Sts., New Albany, Ind.
New Departure Div., General Motors Corp., Bristol, Conn.
New England Cooling Tower Co., 80 Freeport St., Boston 22, Mass.
New Haven Copper Co., The, Seymour, Conn.
New Jersey Zinc Sales Co., Front & Fletcher Sts., New York 7, N. Y.
New York Air Valve Corp., 1850 Atlantic Ave., Brooklyn 33, N. Y.
New York Belting & Packing Co., 1 Market St., Passaic, N. J.
New York Blower Co., 3159 Shields Ave., Chicago 16, Ill.
New York Brass Foundry, 405 Broome St., New York 13, N. Y.
Newark Controls Co., 15 Ward St., Bloomfield, N. J.

Newark Wire Cloth Co., 351 Verona Ave., Newark 4, N. J.
Newcomb-Detroit Co., 5741 Russell St., Detroit 11, Mich.
Newman Co., Inc., I. C., 30 E. 40th St., New York 16, N. Y.
Newport Steel Corp., Rolling Mill Div., Ninth & Lowell Sts., Newport, Ky.
Niagara Blower Co., 405 Lexington Ave., Room 3117, New York 17.
Niagara Industrial Corp., 20 Vesey St., New York 7, N. Y.
Niagara Machine & Tool Wks., 637-697 Northland Ave., Buffalo 11, N. Y.
Nice Ball Bearing Co., 30th and Hunting Park Ave., Philadelphia 40.
Nicholson & Co., W. H., 178 Oregon St., Wilkes-Barre, Pa.
Nikoh Tube Co., 5000 S. Whipple, Chicago 32, Ill.
Niles Rolling Mill Div., Sharon Steel Corp., Niles, O.
Noera Mfg. Co., Div. Chase Brass & Copper Co., Waterbury 20, Conn.
Nooter Corp., 1400 S. Second St., St. Louis 4, Mo.
Nordstrom Valve Div., Rockwell Mfg. Co., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Norge Heat Div., Borg-Warner Corp., 346 E. South St., Kalamazoo, Mich.
Norgren Co., C. A., 3400 So. Elati St., Englewood, Colo.
Norma-Hoffmann Bearings Corp., Stamford, Conn.
Norman Products Co., Inc., 1150 Chesapeake Ave., Columbus, O.
Norristown Magnesia & Asbestos Co., Washington St., Norristown, Pa.
Norse Boiler Co., Inc., New Market, N. J.
North American Mogul Products Co., The, Standard Bldg., Cleveland 13, O.
North American Mfg. Co., 4455 E. 71st St., Cleveland 5, O.
North American Philips Co., Inc., 750 S. Fulton Ave., Mt. Vernon, N. Y.
North Penn Co., 38 E. 21st St., New York 10, N. Y.
Northern Blower Co., 6428 Barberton Ave., Cleveland 2, O.
Northern Indiana Brass Co., 935 Plum St., Elkhart, Ind.
Northern Steel & Stoker Corp., 3100 Prospect Rd., Peoria 4, Ill.
Northwest Heating, Inc., 1944 N. Lombard, Portland 3, Ore.
Northwest Lead Co., 2700 16th Ave., S. W., Seattle 4, Wash.
Norton Co., 1 New Bond, Worcester 6, Mass.
Norwalk Valve Co., South Norwalk, Conn.
Norwood Associated Engineers Inc., 904 Columbus Ave., Springfield, Mass.
Nutmeg Chemical Co., 134 Haven St., New Haven, Conn.
Nu-Way Corp., The, 2416 4th Ave., Rock Island, Ill.
Nye Tool Co., 4120-30 Fullerton Ave., Chicago 39, Ill.

O

OPW Corp., 2735 Colerain Ave., Cincinnati 25, O.
Oakite Products, Inc., 22 Thames St., New York 6, N. Y.
Obear & Son, W. F., 6075 So. Normandie, Los Angeles 44, Calif.
Oberdorfer Foundries, Inc., 3007 Thompson Rd., Syracuse, N. Y.
O'Brien Corp., The, South Bend 21, Ind.
O'Brien Industries, P.O. Box 72, Caldwell, N. J.
O'Brien Steam Specialty Co., Inc., 205 Harrison St., Syracuse 2, N. Y.
Octagon Process, Inc., 15 Bank St., Staten Island 1, New York
Octagon Ventilator Co., 5828-30 S. Oakley Ave., Chicago 36, Ill.
Ohio Brass Co., 380 N. Main St., Mansfield, O.
Ohio Electric Mfg. Co., 5925 Maurice Ave., Cleveland 4, O.
Ohio Foundry & Mfg. Co., Penn R. R. & Slack St., Steubenville, O.
Ohio Injector Co., 275 Main St., Wadsworth, O.
Ohio Pipe Bending & Machine Co., 3900-3910 Trent Ave., Cleveland 9, O.
Ohio Valley Hardware & Roofing Co., Evansville, Ind.
Ohmlac Paint & Refining Co., Inc., 92 Liberty St., New York 6, N. Y.
Oil Equipment Mfg. Corp., 75 Brewster St., New Haven, Conn.
Oil Heat Institute of America, 6 E. 39th St., New York 16, N. Y.
Olsen Testing Machine Co., Tinius, Easton Rd., Willow Grove, Pa.
Olson & Co., Arthur A., Broad St., Canfield, O.
Omega Machine Co., Div. of Builders Iron Foundry, 345 Harris Ave., Providence 1, R. I.
O'Neil-Irwin Mfg. Co., 800 Jefferson, Lake City, Minn.
Orangeburg Mfg. Co., Orangeburg, N. Y.
Ormsby-Osterman, Inc., 3631 Cass Ave., St. Louis 13, Mo.
Orr & Sembower, Inc., Box 1138, Reading, Pa.
Osborn Mfg. Co., 5401 Hamilton Ave., Cleveland 14, O.
Oster Mfg. Co., 2057 E. 61st Pl., Cleveland 3, O.
Ostlind Valve, Inc., 601 N. E. 28th Ave., Portland 12, Ore.
OverHead Heaters, Inc., 1612 Book Bldg., Detroit 26, Mich.
OverSpred Stoker Co., 77 Washington St., Suite 1702, Chicago 2, Ill.
Owens Co., H., 9300 Venice Blvd., Culver City, Calif.
Owens & Co., Inc., Henry, 51 Washington Ave., Cranston 7, R. I.
Owens-Corning Fiberglas Corp., 1911 Nicholas Bldg., Toledo 1, O.
Oxygen Equipment & Service Co., 8335 S. Halsted St., Chicago 20.
Ozalid Div. of General Aniline & Film Corp., 1505 Ansco Rd., Johnson City, N. Y.
Ozone Air Co., 1132 Division Ave., S., Grand Rapids 7, Mich.

P

Paasche Airbrush Co., 1909 Diversey Parkway, Chicago 14, Ill.
Pabco Products Inc., 475 Brannan St., San Francisco 19, Calif.
Pacific Fittings Div., General Metals Corp., Hollydale, Calif.
Pacific Lumber Co., The, 100 Bush St., San Francisco 4, Calif.
Pacific Machine & Iron Wks., Day Island Waterway, Tacoma, Wash.
Pacific Pumping Co., 9201 San Leandro Blvd., Oakland, Calif.
Pacific States Felt & Mfg. Co., Inc., 845 Howard St., San Francisco.
Pacific Steel Boiler Div., United States Radiator Corp., 300 Buhl Bldg., Detroit 31, Mich.
Pacific Transducer Co., 11921 W. Pico Blvd., Los Angeles 64, Calif.
Pacific Tube Co., 5710 Smithway St., Los Angeles 22, Calif.
Packless Metal Hose, Inc., 31-12 Winthrop Ave., New Rochelle, N. Y.
Paddock Engineering Co. of Texas, 2607 Cedar Springs, Dallas, Tex.
Page Steel & Wire, Div. of American Chain & Cable Co., Inc., Monessen, Pa.
Paine Co., 2 Westgate Rd., Addison, Ill.
Paley Mfg. Corp., 244 Herkimer St., Brooklyn 16, N. Y.
Palmer Electric Co., 20 Sproat St., Detroit 1, Mich.
Palmer Mfg. Corp., 2200 W. Filmore St., Phoenix, Ariz.
Palmer Thermometers, Inc., 2501 Norwood Ave., Cincinnati (Norwood) 12, O.
Palnut Co., 106 Cordier St., Irvington, N. J.
Panelyte Div., St. Regis Paper Co., 230 Park Ave., New York 17, N. Y.
Pangborn Corp., 400 Pangborn Blvd., Hagerstown, Md.
Pan-L-Heat Corp., 2838 N. E. Columbia Blvd., Portland 11, Ore.
Paragon Electric Co., 1600 Twelfth St., Two Rivers, Wis.
Paragon-Revolute Corp., 61 South Ave., Rochester 4, N. Y.
Parker Appliance Co., The, 17325 Euclid Ave., Cleveland 12, O.
Parker Boiler Mfg. Co., Sid E., 2035 E. 37th St., Los Angeles 58, Calif.
Parker-Kalon Corp., 200 Varick St., New York 14, N. Y.
Parks-Cramer Co., P. O. Box 444, Fitchburg, Mass.
Patco Mfg. Co., 231 N. Bread St., Philadelphia, Pa.
Patrol Valve Co., The, 2310 E. Superior Ave., Cleveland 14, O.
Patterson-Ballagh Corp., 1900 E. 65th St., Los Angeles, Calif.
Patterson-Kelley Co., Inc., The, 107 Warren St., East Stroudsburg, Pa.
Paul-Lewis Laboratories, Inc., 4253 N. Port Washington Rd., Milwaukee 12, Wis.
Paul Valve Corp., 683 Third Ave., New York 17, N. Y.
Payne Furnace Div., Affiliated Gas Equipment, Inc., 801 Royal Oaks Ave., Monrovia, Calif.
Peabody Engineering Corp., 580 Fifth Ave., New York 36, N. Y.
Pease Co., C. F., The, 2601 W. Irving Park Rd., Chicago 18, Ill.
Peck & Harvey, 5650 N. Western Ave., Chicago 45, Ill.
Peck, Stow & Wilcox Co., Center St., Southington, Conn.
Pecora Paint Co., Inc., 4th St., and Penna. R. R., Philadelphia 40, Pa.
Pedrick Tool & Machine Co., 3640 N. Lawrence St., Philadelphia 40, Pa.
Peer, Inc., 1440 Milton St., Benton Harbor, Mich.
Peerless of America, Inc., 2901 Lawrence Ave., Chicago 25, Ill.
Peerless Electric Co., 1401 W. Market St., Warren, O.
Peerless Heater Div., The Eastern Foundry Co., Boyertown, Pa.
Peerless Pump Div., Food Machinery & Chemical Corp., 301 West Ave., 26, Los Angeles 31, Calif.
Penberthy Injector Co., Div. of Buffalo Eclipse Corp., 1242 Holden Ave., Detroit 2, Mich.
Penn Boiler & Burner Mfg. Corp., Lancaster, Pa.
Penn Brass & Copper Co., 3800 W. 20th St., Erie, Pa.
Penn Controls, Inc., P. O. Box 556, Goshen, Ind.
Penn Galvanizing Co., 2201 E. Tioga St., Philadelphia 34, Pa.
Penn Industrial Instrument Corp., 4110 Haverford Ave., Philadelphia 4, Pa.
Penn Mfg. Corp. of Washington, Pa., 380 W. Chestnut St., P. O. Box 484, Washington, Pa.
Penn Ventilator Co., Goodman above Allegheny Ave., Philadelphia 40, Pa.
Pennant Corp., 200 Grant St., S. W., Grand Rapids 4, Mich.
Pennsylvania Engineering Wks., 526 S. Jefferson St., New Castle, Pa.
Pennsylvania Flexible Metallic Tubing Co., 72nd St. & Powers Lane, Philadelphia 42, Pa.
Pennsylvania Forge Co., Milnor & Bleigh Sts., Philadelphia, Pa.
Pennsylvania Furnace & Iron Co., Warren, Pa.
Pennsylvania Pump & Compressor Co., Easton, Pa.
Pennsylvania Salt Mfg. Co., Widener Bldg., Philadelphia 7, Pa.
% Proportioneers, Inc. %, 381 Harris Ave., Providence 1, R. I.
Perfect Circle Corp., Hagerstown, Md.
Perfection Grate & Stoker Co., 4 Fisk Ave., Springfield 7, Mass.
Perfection Refrigeration Parts Co., Harvey, Ill.
Perfex Corp., 500 W. Oklahoma Ave., Milwaukee 7, Wis.
Perkins Machine Co., 4 Perkins Ave., Warren, Mass.
Perkins & Son, Inc., B. F., Chicopee St., Holyoke, Mass.
Permatex Co., Inc., 1716-1720 Avenue Y, Brooklyn 35, N. Y.
Permutit Co., 330 W. 42nd St., New York 18, N. Y.
Perolin Co., Inc., 1112 W. 37th St., Chicago 9, Ill.
Peters-Dalton, Inc., 17900 Ryan Rd., Detroit 12, Mich.
Peterson Co., B. A., 300 W. R. R. Ave., Dowagiac, Mich.
Petro, 3170 W. 106th St., Cleveland 11, O.
Petrometer Corp., 43-22 Tenth St., Long Island City 1, N. Y.
Pfening Co., Fred D., The, 1075 W. 5th Ave., Columbus 8, O.
Phelps Dodge Copper Products Corp., British American Tube Div., 40 Wall St., New York 5, N. Y.
Phelps Mfg. Co., 715 Thomas St., Little Rock, Ark.
Pheoll Mfg. Co., 5700 Roosevelt Rd., Chicago 50, Ill.
Philadelphia Gear Works, Inc., Erie Ave. & G St., Philadelphia 34, Pa.
Philadelphia Pipe Bending Co., 4135-65 N. Fifth St., Philadelphia 40, Pa.
Philadelphia Thermometer Co., 6th & Cayuga St., Philadelphia 40, Pa.
Philco Corp., Tioga & C Sts., Philadelphia 34, Pa.
Phillips & Co., H. A., 3255 W. Carroll Ave., Chicago 24, Ill.
Phillips Cooling Tower Co., Inc., 220 Dupont St., Brooklyn 22, N. Y.
Phoenix Brass Fittings Corp., Coit St. & Chancellor Ave., Irvington 11, N. J.
Phoenix Mfg. Co., Joliet, Ill.
Phoenix Ventilator Co., Inc., 1665 63rd St., Brooklyn, N. Y.
Photoswitch, Inc., 77 Broadway, Cambridge 42, Mass.
Photovolt Corp., 95 Madison Ave., New York 16, N. Y.

Pick Mfg. Co., West Bend, Wis.
Pierce Co., Wm. B., The, 277 Military Rd., Buffalo 7, N. Y.
Piezo Mfg. Corp., 110 E. 42nd St., New York 17, N. Y.
Pilley Brush Co., Fort Madison, Ia.
Pines Engineering Co., Inc., 685 Walnut St., Aurora, Ill.
Pioneer Pump & Mfg. Co., 19679 John R. St., Detroit 3, Mich.
Pioneer Roofing & Sheet Metal Co., 226 N. Main St., Muskogee, Okla.
Pioneer Tool Co., 1103 Wisconsin Ave., Racine, Wis.
Piping Specialties, Inc., 114 Liberty St., New York 6, N. Y.
Piston Ring Div., Koppers Co., Inc., Bush & Hamburg Sts., Baltimore 3, Md.
Pittsburgh Brass Mfg. Co., 3155 Penn Ave., Pittsburgh, Pa.
Pittsburgh Chemical Laboratories, Inc., 405 Penn Ave., Pittsburgh, Pa.
Pittsburgh Corning Corp., 307 4th Ave., Pittsburgh, Pa.
Pittsburgh Lectrodryer Corp., 327 32nd St., Pittsburgh 30, Pa.
Pittsburgh Nipple Wks., Inc., 1455 Spring Garden Ave., Pittsburgh 12, Pa.
Pittsburgh Pipe Coil & Bending Co., 61 Bridge St., Etna Pittsburgh 23, Pa.
Pittsburgh Piping & Equipment Co., 10 43rd St., Pittsburgh 1, Pa.
Pittsburgh Plate Glass Co., 2600 Grant Bldg., Pittsburgh 19, Pa.
Pittsburgh Steel Co., 800 Grant Bldg., Pittsburgh, Pa.
Pittsburgh Tube Co., 212 Wood St., Pittsburgh 22, Pa.
Pittsburgh Valve & Fittings Corp., Barberton, O.
Pittsburg Water Heater Co., Box 4452, Pittsburgh 5, Pa.
Pittsfield Products, Inc., 2275 Platt Rd., Ann Arbor, Mich.
Plasteel Products Co., McAdams Ave., Washington, Pa.
Plastergon Wall Board Co., Philadelphia Ave., Buffalo 7, N. Y.
Plastex Pipe and Extrusion Co., The, 402 Mt. Vernon Ave., Columbus 3, Ohio
Plastic Products Co., 6475 Georgia Ave., Detroit 11, Mich.
Pleasantaire Corp., 734 15th St., Washington 5, D. C.
Plibrico Jointless Firebrick Co., 1800 Kingsbury St., Chicago 14, Ill.
Plumb Mfg. Co., 1925 Dwyer Ave., Utica 3, N. Y.
Plummer Spray Equipment Co., 700 Filmore St., Napoleon, O.
Plymouth Industries, Inc., 1932 Harrison Ave., Plymouth, Ind.
Poe Co., C. W., The 10526 Wilbur Ave., Cleveland 6, O.
Pokorney Mfg. Co., 3117 Clybourn Ave., Chicago, Ill.
Polaire Cooler Co., Inc., P. O. Box 117, El Mirage, Ariz.
Polis Mfg. Co., J. D., 2900-2920 W. 26th St., Chicago 23, Ill.
Polo Pump Co., Polo, Ill.
Polyken Industrial Tape Dept., Bauer & Black, Div. of the Kendall Co., 222 W. Adams St., Chicago 6, Ill.
Poole Foundry & Machine Co., 1700 Union Ave., Woodberry, Baltimore 11, Md.
Porce-Lin Tank Lining Co., 456 Milwaukee, Detroit, Mich.
Portable Electric Tools, Inc., 320 W. 83rd St., Chicago 20, Ill.
Porter Co., Inc., H. K., 1150 N. Peoria St., Tulsa, Okla.
Porter & Co., Inc., H. W., 825 Frelinghuysen Ave., Newark 5, N. J.
Porter-Cable Machine Co., Syracuse 8, N. Y.
Portmar Boiler Co., Inc., 193 Seventh St., Brooklyn 15, N. Y.
Positive Control Co., The, 2818 Spring Grove Ave., Cincinnati 25, O.
Potter & Brumfield Sales Co., Princeton, Ind.
Potts Co., Horace T., Erie Ave. & "D" St., Philadelphia 34, Pa.
Potts-Farrington Co., 4250 Wissahickon Ave., Philadelphia 29, Pa.
Powder Power Tool Corp., 0719 S. W. Woods, Portland 1, Ore.
Powder Weld Process Co., The, 419 Kent Ave., Brooklyn, N. Y.
Power Engineering Co., 205 West Wacker Dr., Chicago 6, Ill.
Power Mfg. Co., Lansing 12, Mich.
Powell Co., Wm., The, 2525 Spring Grove Ave., Cincinnati 22, O.
Powers Regulator Co., 3400 Oakton St., Skokie, Ill.
Prat-Daniel Corp., 2 Meadow St., South Norwalk, Conn.
Precision Products, Inc., 530 S. Quaker, Tulsa 10, Okla.
Precision Thermometer & Instrument Co., 1506 Brandywine St., Philadelphia 30, Pa.
Precision Welder Mfg. Co., 660 W. Grand Ave., Chicago, Ill.
Preferred Utilities Mfg. Corp., 1860 Broadway, New York 23, N. Y.
Pressed Steel Co., Wilkes Barre, Pa.
Presstite Engineering Co., 3900 Chouteau St., St. Louis 10, Mo.
Pressure Products Corp., 8225 Christiana Ave., Skokie, Ill.
Pritchard & Co., J. F., Equipment Div., 210 W. 10th St., Kansas City 5, Mo.
Proctor & Schwartz, Inc., 7th St. and Tabor Rd., Philadelphia 20, Pa.
Products Research Co., 5426 San Fernando Rd., Glendale 3, Calif.
Propellair Div., Robbins & Myers Inc., Springfield, O.
Proved Products Mfg. Co., Drawer 1190, San Fernando, Calif.
Prox Co., Inc., Frank, 1201 S. First St., Terre Haute, Ind.
Puhl & Hepper Mfg. Co., Inc., 6400 W. Florissant Ave., St. Louis 20, Mo.
Pullman Vacuum Cleaner Co., 31-39 Allerton St., Boston 19, Mass.
Pur Air Div., American Solvent Recovery Corp., 8th & Cassady Aves., Columbus 3, O.
Pure Carbonic, Inc., Div. of Air Reduction Co., Inc., 60 E. 42nd St., New York 17, N. Y.
Pyle-National Co., The, 1373 N. Kostner Ave., Chicago 51, Ill.
Pyott Foundry & Machine Co., 328 N. Sangamon St., Chicago 7, Ill.
Pypon Co., 410 Frick Bldg., Pittsburgh 19, Pa.
Pyrolite Products Co., 1221-1231 W. 74th St., Cleveland 2, O.
Pyrometer Instrument Co., Inc., The, Bergenfield, N. J.

Q

Q-P Mfg. Co., Needham Heights, Mass.
Quaker City Iron Wks., Allegheny & Tulip St., Philadelphia 34, Pa.
Quaker Rubber Corp., Div. H. K. Porter Co., Inc., Comly & Milnor Sts., Philadelphia 24, Pa.
Quality Specialty Co., Inc., 211 N. 2nd St., Philadelphia 6, Pa.
Quickwork Div., Whiting Corp., Harvey, Ill.
Quiet Automatic Oil Burner Corp., 33 Bloomfield Ave., Newark 4, N. J.
Quiet-Heet Mfg. Corp., 135 N.J. R.R. Ave., Newark 5, N. J.
Quigley Co., Inc., 527 Fifth Ave., New York 17, N. Y.
Quik Joint Mfg. Co, 469 E. 159th St., Harvey, Ill.

R

R C S Tool Sales Corp., P. O. Box 1434, Joliet, Ill.
R-S Products Corp., 4600 Germantown Ave., Philadelphia 44, Pa.
Radiant Baseboard Panels, Inc., 900 W. Main St., New Britain, Conn.
Radiant Devices, 4030 Chouteau Ave., St. Louis, Mo.
Radiant Heat Engineering, Inc., 1289 N. Fair Oaks, Pasadena 3, Calif.
Radiant Panel Mfg. Co., 9 E. Pearl St., Torrington, Conn.
Radiant-Ray Radiation, Inc., New Britain, Conn.
Radiant Utilities Corp., 8817-18th Ave., Brooklyn 14, N. Y.
Radiator Specialty Co., 1700-1900 Dowd Rd., Charlotte 1, N. C.
Radiator Valve Co. of America, 428 S. 52nd St., Philadelphia 43, Pa.
Radio Corp. of America, RCA Victor Div., Front & Cooper, Camden, N. J.
Radioactive Products, Inc., 443 W. Congress St., Detroit 26, Mich.
Raisler Corp., Grimes Sprinkler Div., 129 Amsterdam Ave., New York 23, N. Y.
Ramset Fasteners, Inc., 12117 Berea Rd., Cleveland 11, O.
Ramsey Chain Co., Inc., 1029 Broadway, Albany 1, N. Y.
Ramtite Co., The, 2563 W. 18th St., Chicago 8, Ill.
Ranco, Inc., 601 W. 5th Ave., Columbus 1, O.
Randall Graphite Bearings, Inc., 1000 S. Greenlawn Ave., Lima, O.
Ravena Iron Co., Ravena, N. Y.
Rawplug Co., Inc., The, 271 Church St., New York 13, N. Y.
Ray Oil Burner Co., 1301 San Jose Ave., San Francisco 12, Calif.
Raybestos-Manhattan, Inc., 61 Willett St., Passaic, N. J.
Rayfield Co., C. L., 2010-18 S. Halsted St., Chicago 8, Ill.
Raymond Pulverizer Div., Combustion Engineering-Superheater, Inc., 1324 N. Branch St., Chicago, Ill.
R P & C Div., American Chain & Cable Co., Inc., Reading, Pa.
Read Standard Corp., Blower-Stoker Div., York, Pa.
Reading Tube Corp., 36-12 47th Ave., Long Island City, N. Y.
Ready-Power Co., The, 11231 Freud Ave., Detroit 14, Mich.
Reco Products Div., Refrigeration Engineering Corp., 150 Nassau St., New York 38, New York
Red Jacket Mfg. Co., Davenport, Ia.
Red Spot Electric Co., 7405 S. Tacoma Way, Tacoma 9, Wash.
Redmond Co., Inc., Owosso, Mich.
Reed Mfg. Co., 1436 W. 8th St., Erie, Pa.
Reed Unit Fans, Inc., 1001 St. Charles Ave., New Orleans 8, La.
Reeves Pully Co., H. P., Columbus, Ind.
Refinite Corp., P. O. Box 1312, Omaha 8, Neb.
Reflectal Corp., 155 E. 44th St., New York 17, N. Y.
Reflin Co., 16825 South Broadway, P. O. Box 452, Gardena, Calif.
Refractory & Insulation Corp., 120 Wall St., New York 5, N. Y.
Refrigeration Appliances, Inc., 917-923 W. Lake St., Chicago, Ill.
Refrigeration Economics Co., Inc., 1231 Tuscarawas E., Canton 2, O.
Refrigeration Engineering Inc., 7250 E. Slauson Ave., Los Angeles 22, Calif.
Rega Mfg. Co., 79 Mt. Hope Ave., Rochester 20, N. Y.
Register & Grille Mfg. Co., Inc., 70 Berry St., Brooklyn 11, N. Y.
Reichert Float & Mfg. Co., 2238 Smead Ave., Toledo 6, O.
Reif-Rexoil, Inc., 37-41 Carroll St., Buffalo 3, N. Y.
Reilly Tar & Chemical Corp., 1615 Merchants Bank Bldg., Indianapolis 4, Ind.
Reiner & Campbell Co., Inc., 19 Euclid Ave., P. O. Box 5035, Newark 5, N. J.
Reintjes Co., Geo. P., 2517-19 Jefferson St., Kansas City, Mo.
Reliable Metal Engineering Co., 4336-4358 S. Knox, Chicago, Ill.
Reliable Perforating Co., 2047 N. Wood St., Chicago, Ill.
Reliable Products Mfg. Co., 123 De Kalb Ave., Brooklyn, N. Y.
Reliance Automatic Lighting Co., 1929 Mead St., Racine, Wis.
Reliance Electric & Engineering Co., 1058 Ivanhoe Rd., Cleveland 10, O.
Reliance Gauge Column Co., 5902 Carnegie Ave., Cleveland 3, O.
Reliance Refrigerating Machine Co., 3401 N. Kedzie Ave., Chicago, Ill.
Remco, Inc., Zelienople, Pa.
Remington Air Conditioning Div., Remington Corp., Auburn, N. Y.
Remington Arms Co., Inc., Bridgeport, Conn.
Rempe Co., 342 N. Sacramento Blvd., Chicago 12, Ill.
Rensselaer Valve Co., Ontario St., Cohoes, N. Y.
Reps Tool Co., Inc., Box 5, Elmwood Branch, Hartford 10, Conn.
Republic Boiler Corp., 50 W. 50th St., New York, N. Y.
Republic Flow Meters Co., 2240 Diversey Pkwy., Chicago 47, Ill.
Republic Products Co., 7420 State Rd., Philadelphia, Pa.
Republic Rubber Div., Lee Rubber & Tire Corp., Youngstown 1, O.
Republic Steel Corp., Republic Bldg., Cleveland 1, O.
Republic Steel Corp., Bolt & Nut Div., 1970 Carter Rd., Cleveland 13.
Republic Steel Corp., Steel & Tubes Div., 224 E. 131st St., Cleveland 8, O.
Research Corp., Chrysler Bldg., New York 17, N. Y.
Research Products Corp., 1015 E. Washington Ave., Madison 10, Wis.
Research Vacuum Supply Co., 3434 Montrose Ave., Chicago 18, Ill.
Resisto Pipe & Valve Co., 262 Bridge St., East Cambridge, Mass.
Resistoflex Corp., Belleville 9, N. J.
Reuland Electric Co., 3001 W. Mission Rd., Alhambra, Calif.
Revcor, 5201 N. Avondale Ave., Chicago 30, Ill.
Revere Copper & Brass, Inc., 230 Park Ave., New York 17, N. Y.
Rex Clay Products Co., 14414 Dexter Blvd., Detroit, Mich.

Rex Welder & Engineering Co., 409 Southwest Blvd., Kansas City 8, Mo.
Reynolds Electric Co., 3000 River Rd., River Grove, Ill.
Reynolds Mfg. Co., The, Box 333, Comstock Park, Mich.
Reynolds Mfg. Co., Inc., Springfield, Mo.
Reynolds Metals Co., 2000 S. 9th St., Louisville 1, Ky.
Reynolds Shaffer Co., Detroit 4, Mich.
Reznor Mfg. Co., Mercer 8, Pa.
Rheem Mfg. Co., 570 Lexington Ave., New York 22, N. Y.
Rhoads & Sons, J. E., 35 N. Sixth St., Philadelphia 6, Pa.
Rhode Island Fittings Co., 355 Dexter St., Providence 7, R. I.
Rhode Island Humidifier & Ventilating Co., 99 Chauncy St., Boston 11, Mass.
Rhodes, Inc., M. H., 30 Bartholomew Ave., Hartford, Conn.
Richmond Engineering Co., Inc., 7th and Hospital Sts., Richmond, Va.
Richmond Radiator Co., 19 E. 47th St., New York 17, N. Y.
Richmont, Inc., 808 W. Santa Anita St., San Gabriel, Calif.
Ric-wiL Co., Union Commerce Bldg., Cleveland 14, O.
Ridge Tool Co., Clark St., Elyria, O.
Rid-Sludge Div., Aulwood Mfg. Co., 77 Raymond Ave., St. Paul, Minn.
Riggin Metal Products, Inc., Box 267, Kankakee, Ill.
Riggio Co., Frank D., 38 Orient Way, Rutherford, N. J.
Rigidbilt Inc., 2850 W. Fulton St., Chicago 12, Ill.
Riley Stoker Corp., 9 Neponset St., Worcester, Mass.
Rinehart Inc., 511-513 Main St., Richmond, Ind.
Ripley Co., Inc., Middleton, Conn.
Ripley Co., Inc., L-R Blower Div., Middletown, Conn.
Rite Engineering & Mfg. Corp., 144 S. Mission Rd., Los Angeles, Calif.
Ritter Pattern & Casting Co., Inc., 232 Canal St., New York 13, N. Y.
Rittling Corp., The, Hamburg, N. Y.
Robbins & Myers, Inc., Lagonda Ave., Springfield, O.
Robbins & Myers, Inc., Fan Div., 387 S. Front St., Memphis, Tenn.
Roberson Co., L. N., 1539 E. 103rd St., Seattle 55, Wash.
Robert Mfg. Co., 9035 Venice Blvd., Los Angeles 34, Calif.
Roberts-Gordon Appliance Corp., 44 Central Ave., Buffalo 6, N. Y.
Roberts Tube Works, 2500 Military Ave., Detroit 9, Mich.
Robertson Co., H. H., 2400 Farmers Bank Bldg., Pittsburgh 22, Pa
Robinson Aviation, Inc., Teterboro Air Terminal, Teterboro, N. J.
Robinson Clay Product Co., The, 65 W. State St., Akron 9, O.
Robinson Corp., Valley Rd., Roselle Park, N. J.
Robinson Industries, Coleman, Mich.
Robvon Industries, Inc., 675 Garden St., Elizabeth 2, N. J.
Rochester Lead Works, Inc., 380 Exchange St., Rochester 8, N. Y.
Rochester Mfg. Co., Inc., 63 Rockwood St., Rochester 10, N. Y.
Rochester Products, Div. of General Motors Corp., Rochester, N. Y.
Rock Island Register Co., 2435 Fifth Ave., Rock Island, Ill.
Rockford Screw Products Co., 2501 Ninth St., Rockford, Ill.
Rockwell Co., W. S., 254 Eliot St., Fairfield, Conn.
Rockwell Mfg. Co., Meter & Valve Div., 400 N. Lexington Ave., Pittsburgh 8, Pa.
Rockwood Sprinkler Co., 38 Harlow St., Worcester 5, Mass.
Roddick Tool Co., P. O. Box 109, Anaheim, Calif.
Rodwell Engineering & Sales Co., 4303 Dodge St., Omaha, Neb.
Roessing Mfg. Co., 1616 Noble St., Sharpsburg, Pittsburgh 15, Pa.
Roller Bearing Co. of America, Whitehead Rd., Trenton 3, N. J.
Rome-Turney Radiator Co., Canal St., Rome, N. Y.
Ronor Corp., 1360 W. 9th St., Cleveland 13, O.
Roots-Connersville Blower Div., 900 W. Mount St., Connersville, Ind.
Roper Corp., Geo. D., Blackhawk Park Ave., Rockford, Ill.
Rosebraugh Co., W. W., 680 S. 17th St., Salem, Ore.
Rosedale Foundry & Machine Co., Columbus & Preble Aves., N. S., Pittsburgh, Pa.
Ross Engineering Corp., J. O., 444 Madison Ave., New York 22, N. Y.
Ross Sprinkler Co., 34 Roberts St., Pasadena 3, Calif.
Ross Valve Mfg. Co., Inc., 6 Oakwood Ave., Troy, N. Y.
Rotary Concrete Drill Co., 650 S. Arroyo Pkwy., Pasadena, Calif.
Rotary Seal Co., 2020 N. Larrabee St., Chicago 14, Ill.
Roth Co., Roy E., 2420-A 24th Ave., Rock Island, Ill.
Rotometals, Inc., 980 Harrison St., San Francisco 7, Calif.
Rotor Corp., Miamisburg, O.
Royal Heaters, Inc., 1024 Westminster Ave., Alhambra, Calif.
Royal Mfg. Corp., Waterloo, Ind.
Royal Ventilator Co., 415 Locust St., Philadelphia 6, Pa.
Royalton Co., Inc., Gasport, N. Y.
Royersford Foundry & Machine Co., Inc., 101-131 Main St., Royersford, Pa.
Roylyn, Inc., 1706 Standard Ave., Glendale 1, Calif.
Rubatex Div., Great American Industries, Inc., Bedford, Va.
Rubber & Plastics Compound Co., Rockefeller Plaza, New York, N. Y.
Ruberoid Co., 500 Fifth Ave., New York 18, N. Y.
Ruby Chemical Co., 74 McDowell St., Columbus 8, O.
Ruemelin Mfg. Co., 3860 N. Palmer St., Milwaukee 12, Wis.
Ruggles-Klingemann Mfg. Co., 110 Tremont St., Boston, Mass.
Ruppright, Siegfried, Box 6795, Los Angeles 22, Calif.
Russell, Burdsall & Ward Bolt & Nut Co., Port Chester, N. Y.
Russell Co., F. C., The, 1100 Chester Ave., Cleveland 1, O.
Russell Mfg. Co., John M., 852 Rubber Ave., Naugatuck, Conn.
Rust-Oleum Corp., 2425 Oakton St., Evanston, Ill.
Ruthman Machinery Co., 1809 Reading Rd., Cincinnati, O.
Rutland Fire Clay Co., Curtis Ave., Rutland, Vt.
Ruud Mfg. Co., 2934 Smallman St., Pittsburgh 1, Pa.

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SKF Industries, Inc., Front St., & Erie Ave., Philadelphia 32, Pa.
S.O.S. Products Co., Inc., 282 Nassau Ave., Brooklyn 22, N. Y.
Sac Tool Mfg. Co., 1913 Washington Ave., St. Louis 3, Mo.
St. Clair Rubber Co., 440 E. Jefferson, Detroit, Mich.
St. Louis Blow Pipe & Heater Co., Inc., 1948 N. 9th St., St. Louis 6.
St. Louis Tool Co., 6100 Prescott St., St. Louis 15, Mo.
St. Paul Corrugating Co., S. Wabasha and Water Sts., St. Paul 1.
Sales & Co., Murray W., 801 W. Baltimore Ave., Detroit 2, Mich.
Salina Metal Products Co., 9th and Bishop, Salina, Kan.
Sall Bros. Co., 2320 Kishwaukee St., Rockford, Ill.
Sall Mountain Co., Box 777, Hamilton, O.
Salsbury Corp., 1161 E. Florence Ave., Los Angeles 1, Calif.
Sampsel Time Control, Inc., Spring Valley, Ill.
San Angelo Foundry & Machine Co., 1000 E. Upton, San Angelo, Tex.
Sandee Mfg. Co., 5050 W. Foster Ave., Chicago, Ill.
Sangamo Electric Co., 1301 N. 11th St., Springfield, Ill.
Santa Fe Tank & Tower Co., 5401 S. Boyle Ave., Los Angeles 11.
Saran Lined Pipe Co., 2415 Burdette Ave., Ferndale 20, Mich.
Sarco Co., Inc., Empire State Bldg., New York 1, N. Y.
Sarcotherm Controls, Inc., Empire State Bldg., New York 1, N. Y.
Sauereisen Cements Co., Sharpsburg Station, Pittsburgh 15, Pa.
Saunders Mfg. Co., 25 Atherton St., Yonkers, N. Y.
Saverite Engineering Co., 1030 Willow Ave., Hoboken, N. J.
Sawhill Mfg. Co., Sharon, Pa.
Scaife Co., 26 Ann St., Oakmont, Pa.
Schade Valve Mfg. Co., 2527 N. Bodine St., Philadelphia 33, Pa.
Schaible Co., The, 1086 Summer St., Cincinnati 4, O.
Schatz Mfg. Co., The, Fairview, Poughkeepsie, N. Y.
Schaub Engineering Co., Fred H., 2110 S. Marshall Blvd., Chicago 23, Ill.
Schecter Brothers Co., Hancock and Huntingdon Sts., Philadelphia 33, Pa.
Schieren Co., Chas. A., 30-38 Ferry St., New York 7, N. Y.
Schild Mfg. Co., 301 N. Market St., Dallas 2, Tex.
Schmieg Industries, 312-320 Piquette Ave., Detroit 2, Mich.
Schnacke, Inc., 1101 N. Governor St., Evansville, Ind.
Schneible Co., Claude B., 2827 25th St., Detroit 16, Mich.
Schoedinger, F. O., 322-358 Mt. Vernon Ave., Columbus 16, O.
Schramm, Inc., West Chester, Pa.
Schror, Dr. Adolph, 52 Cambridge St., East Orange, N. J.
Schundler & Co., Inc., F. E., 45-15 Vernon Blvd., Long Island City, N. Y.
Schurs Oil Burner Co., 8500 Zamore Ave., Los Angeles 1, Calif.
Schutte and Koerting Co., Cornwells Heights, Bucks County, Pa.
Schwitzer Cummins Co., 1125 E. 22nd St., Indianapolis 7, Ind.
Sciaky Bros. Inc., 4915 W. 67th St., Chicago 38, Ill.
Scientiae Tool Co., 103 Pine, Dayton 2, O.
Scientific Instrument Co., 1041 Second Ave., Detroit 26, Mich.
Scott-Newcomb, Inc., 1922 Pine St., St. Louis, Mo.
Scott Valve Mfg. Co., 3963 McKinley Ave., Detroit 8, Mich.
Scovill Mfg. Co., Waterville Div., Waterville 14, Conn.
Scully Signal Co., 88 First St., Cambridge 41, Mass.
Sealed Power Corp., 500 Sanford St., Muskegon 61, Mich.
Sealol Corp., 45 Willard Ave., Providence 5, R. I.
Seamless Rubber Co., The, F.O.S. Industrial Tape Div., 464 Congress Ave., New Haven 3, Conn.
Seamlex Co., Inc., 41-23 24th St., Long Island City 1, N. Y.
Selas Corp. of America, Erie Ave. and D St., Philadelphia 34, Pa.
Sellers Engineering Co., 4874-76 N. Clark St., Chicago 40, Ill.
Semet-Solvay Engineering Div., Allied Chemical & Dye Corp., 40 Rector St., New York 6, N. Y.
Semler Co., Jeannette, Pa.
Sensenich Corp., Adjacent to Lancaster Municipal Airport, Lancaster, Pa.
Servel, Inc., Evansville 20, Ind.
Service To Industry, Box 133, West Hartford, Conn.
Shafer Bearing Corp., 801 Burlington Ave., Downers Grove, Ill.
Shakeproof, Inc., 2501 N. Keeler Ave., Chicago 39, Ill.
Shallcross Co., 48th and Grays Ferry Rd., Philadelphia 43, Pa.
Shallcross Controls, Inc., 2217-21 N. 31st St., Milwaukee 8, Wis.
Shank Co., Cyrus, 625 W. Jackson Blvd., Chicago 6, Ill.
Sharon Steel Corp., Sharon, Pa.
Shaw Co., Benjamin F., Second & Lombard Sts., Wilmington 99, Del
Shaw-Kendall Engineering Co., 128 S. Superior St., Toledo 4, O.
Shaw-Perkins Mfg. Co., 201 E. Carson St., Pittsburgh 19, Pa.
Sheetlock Co., 4521 N. Clark St., Chicago, Ill.
Sheffler-Gross Co., Drexel Bldg., Philadelphia 6, Pa.
Sheldon Equipment Co., E. H., 716 Nims St., Muskegon, Mich.
Shell Oil Co., Lubricants Dept., 50 W. 50th St., New York 20, N. Y.
Shenango Agaloy Tube Co., Sharon, Pa.
Shephard Heater Co., Inc., 951 Sycamore St., Terre Haute, Ind.
Sherwin-Williams Co., The, 101 Prospect Ave., N. W., Cleveland, O.
Siemon Mfg. Co., 1817-19 Holmes St., Kansas City 8, Mo.
Sier Bath Gear & Pump Co., Inc., North Bergen, N. J.
Sight Feed Generator Co., P. O. Box 38, West Alexandria, O.
Signal Electric Mfg. Co., Menominee, Mich.
Signal Indicator Co., 42 Stewart Ave., Brooklyn 37, N. Y.
Sikes Co., S. R., 1028 S. Third St., Minneapolis 15, Minn.
Silvercote Products, Inc., 161 E. Erie St., Chicago 11, Ill.
Simplex Ceiling Corp., 552 W. 52nd St., New York 19, N. Y.
Simplex Heating Specialty Co., Inc., 954 Cabell St., Lynchburg, Va.
Simplex Mfg. Co., 198 N. Main St., Fond du Lac, Wis.
Simplex Oil Heating Corp., 11 Park Pl., New York 7, N. Y.
Sims Co., 18th & Whitley Sts., Erie, Pa.
Sinker-Davis Co., 230 S. Missouri St., Indianapolis 4, Ind.
Sioux Steel Co., P. O. Box 898, Sioux Falls, S. D.
Sipe & Co., James B., Box 8010, Pittsburgh 16, Pa.
Skidmore Corp., St. Joseph, Mich.
Skilbeck Mfg. Co., 7432 27th Ave., Kenosha, Wis.
Skil Corp., 5033 Elston Ave., Chicago 30, Ill.
Skinner Co., M. B., South Bend 21, Ind.
Skinner Electric Valve Div., 40 Belden Ave., Norwalk, Conn.
Skinner Engine Co., 337 W. 12th St., Erie, Pa.
Skinner Irrigation Co., 121 E. Canal St., Troy, O.

Slant-Fin Radiator Corp., 5113-17 2nd Ave., Brooklyn, N. Y.
Sly Mfg. Co., W. W., 4700 Train Ave., Cleveland 2, O.
Small Motors, Inc., 2076 Elston Ave., Chicago 14, Ill.
Smith, J. V., 414 S. Harvey, Oak Park, Ill.
Smith Co., Inc., H. B., The, 64 Main St., Westfield, Mass.
Smith Co., J. B., 3327 B St., Philadelphia 34, Pa.
Smith Control & Instrument Corp., Palmyra, N. J.
Smith Corp., A. O., 3533 N. 27th St., Milwaukee 1, Wis.
Smith Corp., A. O., Eastern Motor Div., Dayton 4, O.
Smith Corp., Winfield, H., 144 Eaton St., Springfield, Erie County, N. Y.
Smith Filter Corp., 1603-2 Ave., Moline, Ill.
Smith & Kanzler Corp., E. Linden Ave., Linden, N. J.
Smith Products Co., 14940 Washburn, Detroit, Mich.
Smith-Raymond Co., 1231-33 Tenth Ave., Columbus, Ga.
Smith & Serrell, Inc., 200 Washington St., Newark 2, N. J.
Smith Twin Tubular Boiler Co., Inc., Cottman St., at State Rd., Philadelphia 35, Pa.
Smith Welding Equipment Corp., 2633 S. E. Fourth St., Minneapolis 14, Minn.
Smolensky Valve Co., Inc., 940 Broadway, Bedford, O.
Smooth-On Mfg. Co., 568-574 Communipaw Ave., Jersey City 4, N. J.
Snap-on Tools Corp., Kenosha, Wis.
Snap-Tite, Inc., Union City, Pa.
Socony-Vacuum Oil Co., Inc., 26 Broadway, New York 4, N. Y.
Sola Electric Co., 4633 W. 16th St., Chicago 50, Ill.
Soldering Specialties Co., Summit, N. J.
Solon Mfg. Co., Solon, O.
Solvay Process Div., Allied Chemical & Dye Corp., 61 Broadway, New York 6, N. Y.
Somers, Inc., H. J., 6063 Wabash Ave., Detroit 8, Mich.
Somerville Iron Wks., Somerville, N. J.
Sonneborn Sons, Inc., L., 88 Lexington Ave., New York 16, N. Y.
Sonner Burner Co., 412-420 E. 6th Ave., Winfield, Kans.
Sonoco Products Co., Hartsville, S.C.
Soreng Mfg. Co., 9551 Soreng Ave., Schiller Park, Ill.
South Bend Air Products, Inc., 322 E. Colfax Ave., South Bend 22, Ind.
South Chester Corp., Southco Div., Lester, Pa.
South Chester Tube Co., Front & Thurlow Sts., P. O. Box 60, Chester, Pa.
Souther Iron Co., E. E., 1952 Kienlen Ave., St. Louis 20, Mo.
Southport Paint Co., Div. Wesson Oil & Snowdrift Co., Inc., Savannah, Ga.
Spang-Chalfant, Div. of National Supply Co., P. O. Box 416, Pittsburgh 30, Pa.
Spartan Tool Co., 1918 Columbia Ave., Chicago 26, Ill.
Speakman Co., Riverview Wks., Wilmington 99, Del.
Special Chemicals Corp., 30 Irving Pl., New York 3, N. Y.
Speed Selector Inc., 118 Noble Court, Cleveland 13, O.
Speedway Mfg. Co., 1834 S. 52nd Ave., Chicago (Cicero), Ill.
Spence Engineering Co., Inc., 32 Grant St., Walden, N. Y.
Spencer Heater, Lycoming-Spencer Div., Avco Mfg. Corp., Williamsport, Pa.
Spencer Thermostat Div., Metals & Controls Corp., 34 Forest St., Attleboro, Mass.
Spencer Turbine Co., 486 New Park Ave., Hartford 6, Conn.
Sponge Rubber Products Co., The, Shelton, Conn.
Sporlan Valve Co., 7525 Sussex Ave., St. Louis 17, Mo.
Spray Engineering Co., 114 Central St., Somerville 45, Mass.
Spraying Systems Co., 3219 Randolph St., Bellwood, Ill.
Sprayo-Flake Co., 2715 Irving Park Blvd., Chicago 18, Ill.
Spring Packing Corp., 332 S. Michigan Ave., Chicago, Ill.
Springfield Boiler Co., 1939 E. Capitol Ave., Springfield, Ill.
Sprout-Waldron & Co., Muncy, Pa.
Spurgeon Co., 23501 Hoover Rd., Van Dyke, Mich.
Square D Co., 6060 Rivard St., Detroit 11, Mich.
Square D Co., Industrial Controller Div., 4041 N. Richards St., Milwaukee 12, Wis.
Squires Co., C. E., The, 18502 Syracuse Ave., Cleveland 10, O.
Staffco Engrg. Corp., 6600 S. Austin Ave., Chicago 38, Ill.
Stamco Inc., New Bremen, O.
Stanat Mfg. Co., 47-28 37th St., Long Island City 1, N. Y.
Standard Asbestos Mfg. Co., 860 W. Evergreen Ave., Chicago 22, Ill
Standard Electric Mfg. Co., West Berlin, N. J.
Standard Engineering Wks., 289 Roosevelt Ave., Pawtucket, R. I.
Standard Fuel Engineering Co., 667 Post Ave., S., Detroit 17, Mich.
Standard Machine & Mfg. Co., 8213-15 Gravois Ave., St. Louis 23, Mo.
Standard Oil Co. of California, Bldg. 605, West Olympic Blvd., Los Angeles, Calif.
Standard Oil Co. of Indiana, 910 S. Michigan Ave., Chicago, Ill.
Standard Pressed Steel Co., Box 810, Jenkintown, Pa.
Standard Refrigeration Co., 3535 Fillmore St., Chicago 24, Ill.
Standard Reseater Corp., 423 W. 126th St., New York 27, N. Y.
Standard Rolling Mills, Inc., 196 Diamond St., Brooklyn 22, N. Y.
Standard Stamping & Perforating Co., 3151 W. 49th Pl., Chicago 32, Ill.
Standard Thermometer, Inc., 952 Dorchester Ave., Boston 25, Mass.
Standard Transmission Equipment Co., 78 W. Union St., Pasadena 1, Calif.
Standard Tube Co., 24400 Plymouth Rd., Detroit 28, Mich.
Standard Ventilator Co., Lewisburg, Pa.
Stanley Electric Tools, Div. of The Stanley Works, Myrtle St., New Britain, Conn.
Stanley Works, The, 195 Lake St., New Britain, Conn.
Staples & Pfeiffer, 528 Bryant St., San Francisco 7, Calif.
Sta-Rite Products, Inc., Delavan, Wis.
Star Expansion Bolt Co., 147 Cedar St., New York 6, N. Y.
Star-Kimble Motor Div., Miehle Printing Press & Mfg. Co., 200 Bloomfield Ave., Bloomfield, N. J.
Star Tubular Products Co., 4747 S. Richmond St., Chicago, Ill.
Steam Turbine Div., Worthington Pump & Machinery Corp., Wellsville, N. Y.
Stedco Products, 71 Lehigh St., Wilkes-Barre, Pa.
Steel City Electric Co., 1201 Columbus Ave., Pittsburgh, Pa.
Steelcote Mfg. Co., 3418 Gratiot St., St. Louis, Mo.
Steel Improvement & Forge Co., 974 E. 64th St., Cleveland 14, O.
Steel Products Engineering Co., The, 1205 W. Columbia St., Springfield, O.
Steinen Mfg. Co., Wm., 43 Bruen St., Newark, N. J.
Stephens-Adamson Mfg. Co., 47 Ridgeway Ave., Aurora, Ill.
Sterling Air Conditioning Corp., 1430 K St., N. W., Washington, D. C.
Sterling Electric Motors, Inc., 5401 Anaheim Telegraph Rd., Los Angeles 22, Calif.
Sterling Engineering & Mfg. Corp., 114 Business St., Hyde Park 36, Mass.
Sterling, Inc., 3744 N. Holton St., Milwaukee 12, Wis.
Sterling Radiator Co., Inc., Westfield, Mass.
Sterns-Flinn Corp., 30 Church St., New York 7, N. Y.
Stevens Mfg. Co., Inc., Mansfield, O.
Stewart Ice Machine Co., 1282 W. 1st St., Pomona, Calif.
Stewart Mfg. Co., Inc., Grove Ave., Cedar Grove, N. J.
Stewart-Warner Corp., South Wind Div., 1514 Drover St., Indianapolis, Ind.
Stic-Klip Mfg. Co., 50 Regent St., Cambridge 40, Mass.
Stickle Steam Specialties Co., 2215 Valley Ave., Indianapolis 1, Ind.
Stillwater Clay Products Co., The, 3334 Prospect Ave., Cleveland 15.
Stockham Valves & Fittings Co., Box 2592, Birmingham 2, Ala.
Stokes Machine Co., F. J., 5910 Tabor Rd., Philadelphia 20, Pa.
Stokes Molded Products, Inc., Taylor & Webster, Trenton 4, N. J.
Stout & Sons, David, 7016 Manchester Blvd., St. Louis 17, Mo.
Stover Water Softener Co., 10 State St., St. Charles, Ill.
Stow Mfg. Co., 445 State St., Binghamton, N. Y.
Strahman Valves, Inc., 16-22 Hudson St., New York 13, N. Y.
Straight Line Foundry & Machine Corp., Direct Separator Div., The, 218 S. Geddes St., Syracuse 4, N. Y.
Strandwitz & Co., Inc., W. J., Jefferson and Master Sts., Camden, N. J.
Stratford Pipe Scalloper Machine Co., 49 Oakland Pl., Stratford, Conn
Strong, Carlisle & Hammond Company, 1392 W. Third St., Cleveland 13, O.
Struthers-Dunn, Inc., 150 N. 13th St., Philadelphia 7, Pa.
Struthers Wells Corp., Titusville, Pa.
Stuart Supply, 417 Ninth St., Des Moines 9, Iowa.
Sturtevant Co., P. A., Addison, Ill.
Sub-Zero Products Co., 3928 Reading, Cincinnati 29, Ohio
Sudbury Laboratory, South Sudbury, Mass.
Sulflo, Inc., 1143 E. Jersey St., Elizabeth 4, N. J.
Sullivan Valve & Engineering Co., 1400 E. Second St., Butte, Mont.
Sumo Pumps, Inc., 375 Fairfield Ave., Stamford, Conn.
Sundstrand Machine Tool Co., Hydraulic Div., 2531 11th St., Rockford Ill.
Sun-Fire Stoker Corp., New Albany, Ind.
Sun Oil Co., 1608 Walnut St., Philadelphia 3, Pa.
Sun-Ray Burner Mfg. Corp., 139-24 Queens Blvd., Jamaica 2, N. Y
Super-Cold Corp., 1020 E. 59th St., Los Angeles, Calif.
Super Mold Corp., 402 N. Sacramento St., Lodi, Calif.
Super Radiator Corp., 6714 Walker St., St. Louis Park, Minneapolis 16, Minn.
Superior Clay Corp., The, Uhrichsville, O.
Superior Combustion Industries, Inc., 1475 Broadway, New York 18, N. Y.
Superior Controls Co., Inc., 1835 South Bonnie Brae, Los Angeles 6, Calif.
Superior Steel Corp., Grant Bldg., Pittsburgh 19, Pa.
Superior Tube Co., Norristown, Pa.
Superior Valve and Fittings Co., 1509 W. Liberty Ave., Pittsburgh 26, Pa.
Supreme Air Filter Co., 126 W. 21st St., New York, N. Y.
Supreme Electric Products Corp., 194 Vassar St., Rochester 7, N. Y
Surface Combustion Corp., 2375 Dorr St., Toledo 1, O.
Sutton Corp., O. A., The, 1812 W. Second St., Wichita 2, Kan.
Swaby Mfg. Co., 3818 W. Armitage Ave., Chicago 47, Ill.
Swaine Mfg. Co., Fred J., 1300 N. Seventh St., St. Louis 6, Mo.
Swallow Airplane Co., Wichita, Kan.
Swartwout Co., The, 18511 Euclid Ave., Cleveland 12, O.
Swift & Co., Adhesive Products Dept., Chicago 9, Ill.
Swift Lubricator Co., 19 James Bldg., Elmira, N. Y.
Swift Mfg. Co., Inc., 1455 E. Nine Mile Rd., Hazel Park, Mich.
Synchronous Flame, Inc., 327 S. La Salle St., Chicago, Ill.
Synchro-Start Products, Inc., 8151 N. Ridgeway Ave., Skokie, Ill.
Syncromatic Corp., Watertown, Wis.
Syntron Co., Homer City, Pa.

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T & H Engineering Co., 401 Main St., Little Ferry, N. J.
Taber Pump Co., 272 Elm St., Buffalo 3, N. Y.
Taco Heaters, Inc., 137 South St., Providence, R. I.
Tagliabue Instruments Div., Weston Electric Instrument Corp., 614 Frelinghuysen Ave., Newark 5, N. J.
Tal-Bender, Inc., 417 N. Water St., Milwaukee 2, Wis.
Taller & Cooper, Inc., 75 Front St., Brooklyn 1, N. Y.

Tallmadge Systems, Webster, Div. of Hoffman Specialty Mfg. Corp., 1001 York St., Indianapolis 7, Ind.
Talon Tools, Inc., North Arlington, N. J.
Tamms Industries, Inc., 228 N. LaSalle St., Chicago 1, Ill.
Taylor Co., Halsey W., 1259 N. Park Ave., Warren, O.
Taylor Forge & Pipe Wks., P. O. Box 485, Chicago 90, Ill.
Taylor Instrument Companies, 95 Ames St., Rochester 1, N. Y.
Taylor Sons Co., Charles, 710 Burns St., Cincinnati 14, O.
Taylor-Winfield Corp., 1052 Mahoning Ave., N. W., Warren, O.
Technical Ply-Woods, 228 N. LaSalle St., Chicago 1, Ill.
Technical Products Co., 1240 N. Canal, Sharpsburg, Pa.
Techniflex Corp., Port Jervis, N. Y.
Techtmann Industries, Inc., 714 W. Wisconsin Ave., Milwaukee 1.
Tecumseh Products Co., Tecumseh, Mich.
Telechron, Inc., Ashland, Mass.
Telsit Insulation Co., 1933 West Farms Rd., Bronx 60, N. Y.
Templeton Bros., 177 Reservation Rd., Hyde Park 36, Mass.
Tempmaster Corp., 1338 McGee St., Kansas City, Mo.
Tempo Products Co., 1900 Euclid Ave., Cleveland 15, O.
Temprite Products Corp., Dept. HPAC, E. Maple Rd., Birmingham, Mich.
Tennessee Coal & Iron Div., United States Steel Corp., P. O. Box 599, Fairfield, Ala.
Tennessee Products and Chemical Corp., First American National Bank Bldg., Nashville, Tenn.
Tenney Engineering, Inc., 26 Avenue B, Newark 5, N. J.
Terre Haute Boiler Works Co., 1140 Crawford, Terre Haute, Ind.
Terry Steam Turbine Co., The, P. O. Box 1200, Hartford 1, Conn.
Texas Co., The, 135 E. 42nd St., New York 17, N. Y.
Texas Vitrified Products Co., Mineral Wells, Tex.
Texsteam Corp., 320 Hughes St., Houston 11, Tex.
Thermac Co., 800 E. 108th St., Los Angeles, Calif.
Thermapanels, Inc., 342 Lincoln Ave., San Jose, Calif.
Thermek Sales Co., P. O. Box 268, Whitewater, Wis.
Thermix Corp., The, Greenwich, Conn.
Thermo-Base Div., Gerwin Industries, 214 Spring St., Michigan, Ind.
Therm-O-Disc, Inc., 127 Crouse St., Mansfield, O.
Therm-O-Wheel, Inc., Div. of Crowell Associates, 225 Lafayette St., New York, N. Y.
Thermoid Co., Trenton, N. J.
Thomas Co., Arthur H., W. Washington Square, Philadelphia, Pa.
Thompson & Co., 1085 Allegheny Ave., Oakmont, Pa.
Thompson & Son Co., The Henry G., 277 Chapel St., New Haven, Conn.
Thompson Research & Mfg. Co., Davenport, Fla.
Thomson Electric Welder Co., 161 Pleasant St., Lynn, Mass.
Thomson Industries, Inc., Manhasset, N. Y.
Thor Tool & Die Co., 865 Estabrook, San Leandro, Calif.
Thread-Ezy Mfg. Co., Corunna, Mich.
Threadwell Tap & Die Co., Greenfield, Mass.
Three Point Industries, 3767 N. Racine Ave., Chicago 13, Ill.
Thrush & Co., H. A., Peru, Ind.
Thwing-Albert Instrument Co., Penn and Pulaski Ave., Philadelphia 44, Pa.
Tierney Rotor Ventilator Co., 239 Fourth Ave., S., Minneapolis, Minn.
Tiffin Eaves Trough Clamp Co., 25 Miami, Tiffin, O.
Time 'Trol Co., 2 Embassy Court, Great Neck, L. I., N. Y.
Timken Roller Bearing Co., 1835 Dueber Ave., S. W., Canton 6, O.
Timken Silent Automatic Div., Timken-Detroit Axle Co., Jackson, Mich.
Tinnerman Products, Inc., P. O. Box 6688, Cleveland 1, O.
Tippett & Wood, Morris and Warren Sts., Phillipsburg, N. J.
Titan Mfg. Co., 701 Seneca St., Buffalo 10, N. Y.
Titchener, E. H. & Co., 67 Clinton St., Binghamton, N. Y.
Titeflex, Inc., 469 Frelinghuysen Ave., Newark 5, N. J.
Titus Mfg. Corp., 113 E. 8th St., Waterloo, Iowa
Titusville Iron Wks. Co., The, Titusville, Pa.
Todd Shipyards Corp., Combustion Equipment Div., 81-16-45th Ave., Elmhurst, L. I., N. Y.
Toledo Pipe Threading Machine Co., 1445 Summit St., Toledo 4, O.
Torit Mfg. Co., 292 Walnut St., St. Paul 2, Minn.
Tork Clock Co., Inc., 1 Grove St., Mt. Vernon, N. Y.
Torq Electric Mfg. Corp., 1006 Interstate St., Bedford, O.
Torrington Co., The, Bantam Bearings Div., South Bend 21, Ind.
Torrington Mfg Co., 70 Franklin St., Torrington, Conn.
Torrington Mfg. Co., The, Western Div., 15001 Oxnard St., Van Nuys, Calif.
Trade-Wind Motorfans, Inc., 5707 S. Main St., Los Angeles 37, Calif.
Trane Co., The, La Crosse, Wis.
Trent, Inc., Leverington Ave. and Wilde St., Philadelphia 27, Pa.
Trent Tube Co., 430 Church St., East Troy, Wis.
Trerice Co., H. O., 1420 W. Lafayette Blvd., Detroit 16, Mich.
Triangle Conduit & Cable Co., Inc., Plastic Products Div., New Brunswick, N. J.
Triangle Mfg. Co., 396 Division St., Oshkosh, Wis.
Tri-Clover Machine Co., 2809 60th St., Kenosha, Wis.
Trimont Mfg. Co., Div. of Aetna Industrial Corp., 55-71 Amory St., Roxbury, Boston 19, Mass.
Trimount Instrument Co., 3119 W. Lake St., Chicago 12, Ill.
Trimount Rotary Power Co., 189 Cedar St., Dedham, Mass.
Trindl Products, Ltd., 17 E. 23rd St., Chicago 16, Ill.
Trinity Equipment Corp., Roselle Park, New Jersey
Trion, Inc., McKees Rocks, Pa.
Tripar Products, Inc., 14641 West Eleven Mile Rd., Royal Oak, Mich.
Triplex Heating Specialty Co., Inc., 252 N. Grant, Peru, Ind.
Trombetta Solenoid Corp., 329 N. Milwaukee St., Milwaukee 2, Wis.
Tropical Paint & Oil Co., 1244-82 W. 70th St., Cleveland 2, O.
Troy Engine & Machine Co., 20 Railroad Ave., Troy, Pa.
Truetite Corp., The, 36 Union Ave., Bridgeport 7, Conn.
Truflo Fan Co., 523 Main St., Harmony, Pa.
Tru-Line Corp., 1725 Clover Field Blvd., Santa Monica, Calif.
Trumbull Dept., General Electric Co., Woodford Ave., Plainville, Conn.
Truscon Laboratories, Caniff and Trunk R. R., Detroit 11, Mich.
Truscon Steel Co., 1315 Albert St., Youngstown 1, O.
Tryco Products, Inc., Railroad Sq., Westfield, Mass.
Tube Turns, Inc., 224 E. Broadway, Louisville 1, Ky.
Tubing Appliance Co., 10321 Anza Ing., Los Angeles, Calif.
Tubing Seal-Cap, Inc., 808 W. Santa Anita, San Gabriel, Calif.
Turco Products, Inc., 6135 S. Central Ave., Los Angeles 1, Calif.
Turner Brass Wks., The, 821-47 Park Ave., Sycamore, Ill.
Tuthill Pump Co., 939 E. 95th St., Chicago 19, Ill.
Tuttle & Bailey, Inc., Corbin Ave., New Britain, Conn.
Tweco Products Co., P. O. Box 666, Wichita 1, Kan.
Twin Disc Clutch Co., 1310 Preston St., Rockford 16, Ill.
Typhoon Air Conditioning Co., Inc., 794 Union St., Brooklyn 15, N. Y.

U

[Also see "United States"]

U. S. Electric Welder Corp., 1258 Dorr St., Toledo, O.
U. S. Electrical Motors, Inc., 200 E. Slauson Ave., Los Angeles 54.
U. S. Electrical Tool Co., 1050 Findlay St., Cincinnati 14, O.
U. S. Expansion Bolt Co., P. O. Box 827, State St. & P.R.R., York, Pa.
U. S. Machine Corp., Div. of Stewart-Warner Corp., Lebanon, Ind.
U. S. Pipe & Mfg. Co., East Grand Ave., S. San Francisco, Calif.
U. S. Plug & Fitting Co., Wellington, O.
U. S. Thermo Control Co., 44 S. 12th St., Minneapolis, Minn.
Uehling Instrument Co., 473 Getty Ave., Paterson 3, N. J.
Ultrasonic Corp., 61 Rogers St., Cambridge 42, Mass.
Ultra-Viscoson Corp., The, 1240 Main St., Hartford 3, Conn.
Unexcelled Chemical Corp., Empire State Bldg., New York, N. Y.
Uniflow Mfg. Co., E. Lake Rd., Erie, Pa.
Unimax Switch Div., W. L. Maxson Corp., 461 W. 34th St., New York 1, N. Y.
Union Asbestos & Rubber Co., 332 S. Michigan Ave., Chicago 4, Ill.
Union Iron Wks., 1500 Cascade St., Erie, Pa.
Union Malleable Mfg. Co., Ashland, O.
Union Metal Wks., 128 Carter St., Chelsea 50, Mass.
Union Spring & Mfg. Co., 1057 Summit Ave., Jersey City, N. J.
Union Steam Pump Co., Capitol Ave., S. W., Battle Creek, Mich.
Union Water Meter Co., 333 Hermon St., Worcester, Mass.
Unistrut Products Co., 1013 W. Washington Blvd., Chicago 7, Ill.
Unit Alarm Co., The, P. O. 17 Saratoga Dr., Schenectady, N. Y.
United Chromium, Inc., 100 E. 42nd St., New York 17, N. Y.
United Conditioning Corp., Croton Falls, N. Y.
United Cooling Tower Co., 4022 Broadway, Kansas City, Mo.
United Cork Companies, Central Ave., Kearny, N. J.
United Electric Controls Co., 85 School St., Watertown, Mass.
United Electric Service Co., P. O. Box 119, Wichita Falls, Tex.
United Industries, Box 449, Madison 1, Wis.
United Metal Hose Co., Inc., 36-01 43rd Ave., Long Island City 1, N. Y.

[Also see "U. S."]

United States Air Conditioning Corp., 33rd & Como Ave., S. E., Minneapolis 14, Minn.
United States Gasket Co., 602 N. 10th St., Camden, N. J.
United States Gauge Div. of American Machine and Metals, Inc., Sellersville, Pa.
United States Gypsum Co., 300 W. Adams St., Chicago 6, Ill.
United States Mineral Wool Co., Stanhope, N. J.
United States Ozone Co. of America, Crescent St., Scottdale, Pa.
United States Pipe & Foundry Co., Burlington, N. J.
United States Plywood Corp., 55 West 44th St., New York 18, N. Y.
United States Radiator Corp., 300 Buhl Bldg., Detroit 31, Mich.
United States Register Co., Burnham St., Battle Creek, Mich.
United States Rubber Co., 1230 Ave. of the Americas, New York 20, N. Y.
United States Steel Co., 525 Wm. Penn Place Bldg., Pittsburgh 30, Pa.
United States Steel Supply Co., 1319 Wabansia St., Chicago, Ill.
United States Stoneware Co., 60 E. 42nd St., New York 17, N. Y.
Universal Convector Corp., 230 Manida St., New York 59, N. Y.
Universal-Cyclops Steel Corp., Bridgeville, Pa.
Universal Diffuser Corp., 890 Whittier St., New York 59, N. Y.
Universal Gypsum & Lime Co., 111 W. Washington St., Chicago, Ill.
Universal Valve Co., P. O. Box 444, Elizabeth, N. J.
Universal Welder Corp., 735 Carnegie Ave., Cleveland 15, O.
Uno Ventilator Co., 1236 Eastern Ave., Malden 48, Mass.
Up-Right Scaffolds, 1013 Pardee St., Berkeley 10, Calif.
Utica Products, Inc., Utica 4, N. Y.
Utica Radiator Corp., 2201 Dwyer Ave., Utica 2, N. Y.
Utility Appliance Corp., 4851 S. Alameda St., Los Angeles 58, Calif.
Utility Laboratory, Inc., 330 36th St., Brooklyn 32, N. Y.

V

V. & E. Products, Inc., Schuylkill Haven, Pa.
V-Belt Clutch Co., 418 N. Western Ave., Los Angeles 4, Calif.
Vacuum-Electronic Engineering Co., 86 Denton Ave., New Hyde Park, L. I., N. Y.
Valley Foundry & Machine Works, Inc., Fresno, Calif.
Vanderman Mfg. Co., Mansfield Ave., Willimantic, Conn.
Van Noorden Co., E., 100 Magazine St., Boston 19, Mass.
Van-Packer Corp., 209 S. La Salle St., Chicago 4, Ill.
Vanton Pump Corp., Empire State Bldg., New York 1, N. Y.
Vapofier Corp., 10316 S. Throop St., Chicago 43, Ill.

Vapor Heating Corp., 80 E. Jackson Blvd., Chicago 4, Ill.
Velan Engineering Co., 1 Exchange Pl., Jersey City, N. J.
Velocity Power Tool Co., 7505 Thomas Blvd., Pittsburgh 8, Pa.
Verson Allsteel Press Co., 93rd & Kenwood Ave., Chicago 19, Ill.
Verson Mfg. Co., S. Lamar St. & Ledbetter Dr., Dallas, Tex.
Vibration Eliminator Co., 10-28 47th Ave., Long Island City 1, N. Y.
Victaulic Co. of America, P. O. Box 509, Elizabeth, N. J.
Victor Equipment Co., Welding Equipment Div., 844 Folsom St., San Francisco 7, Calif.
Victor Products Corp., 2633 Belmont Ave., Chicago 18, Ill.
Victory Engineering Corp., Springfield Rd., Union, N. J.
Viking Copper Tube Co., 16700 St. Clair Ave., Cleveland 10, O.
Viking Mfg. Corp., 1747 Chester Ave., Cleveland 14, O.
Viking Pump Co., Fourth and Rouse Sts., Cedar Falls 1, Ia.
Viking Shear Co., 1063 W. 19th St., Erie, Pa.
Vilter Mfg. Co., The, 2148 S. First St., Milwaukee 7, Wis.
Vinco Co., Inc., The, 305 E. 45th St., New York 17, N. Y.
Virginia Smelting Co., West Norfolk, Va.
Vogt Machine Co., Henry, 1000 W. Ormsby St., Louisville 10, Ky.
Voss Co., Inc., J. H. H., 785 E. 144th St., Corner of Wales Ave., New York 54, N. Y.
Vulcan Electric Co., 88-90 Holten St., Danvers, Mass.
Vulcan Radiator Co., 16 Francis Ave., Hartford 2, Conn.

W

W. C. Products, Inc., 1748 Berkeley St., Santa Monica, Calif.
W. G. B. Oil Clarifier, Inc., Kingston, N. Y.
Wabash Mfg. Co., 2318 S. Western Ave., Chicago 8, Ill.
Wachs Co., E. H., The, 1525 N. Dayton St., Chicago 22, Ill.
Wade Mfg. Co., Elgin, Ill.
Wagner Awning & Mfg. Co., 2658 Scranton Rd., Cleveland, O.
Wagner Electric Corp., 6370 Plymouth Ave., St. Louis 14, Mo.
Waldron Corp., John, New Brunswick, N. J.
Walker Jamar Co., 365 S. First Ave., E., Duluth, Minn.
Wallace Co., William, Metalbestos Div., Belmont, Calif.
Wallace Supplies Mfg. Co., 1304-12 Diversey Pkwy., Chicago 14, Ill.
Wallace & Tiernan Co., Inc., P. O. Box 178, Newark 1, N. J.
Walsh Co., The, L. M., 755 Boylston St., Boston 16, Mass.
Walsh-Holyoke Steam Boiler Co., Holyoke, Mass.
Walsh Refractories Corp., 101 Ferry St., St. Louis 7, Mo.
Walton Co., Box 5, Elmwood Branch, Hartford 10, Conn.
Walton Laboratories, Inc., 1186 Grove St., Irvington 11, N. J.
Walworth Co., 60 E. 42nd St., New York 17, N. Y.
Ward Foundries, Inc., J. P., Blossburgh, Pa.
Ward Leonard Electric Co., 24 South St., Mt. Vernon, N. Y.
Ware Coupling & Nipple Co., Ware, Mass.
Warlo Corp., 330 W. 42nd St., New York 18, N. Y.
Warner Lewis Co., 817 N. Lewis Pl., Tulsa, Okla.
Warner Ventilator Co., 225 Spring St., La Grange, Ind.
Warren Engineering Co., Broadway, N. J.
Warren Foundry & Pipe Corp., 55 Liberty St., New York 5, N. Y.
Warren Refining & Chemical Co., The, 750 Prospect Ave., Cleveland 15, O.
Warren Steam Pump Co., Inc., 300 Bridges Ave., Warren, Mass.
Washburne & Co., E. G., 207 Fulton St., New York, N. Y.
Washington Steel Corp., Griffith Ave., Washington, Pa.
Wasserlein Mfg. Co., Inc., 126 W. Cass St., Joliet, Ill.
Water Cooling Corp., 71 Nassau St., New York 38, N. Y.
Water Cooling Equipment Co., 8601 New Hampshire, St. Louis 23, Mo.
Water Cooling Tower Co., 5501 Cornell Ave., Chicago, Ill.
Water Refining Co., 1123 Barthold, Ft. Wayne, Ind.
Water Service Laboratories, Inc., 423 W. 126th St., New York 27.
Water Tight Underground Conduit, P. O. Box 12211, Houston 17, Tex.
Water Treatment Company of America, 1159 Hodgkiss St., Pittsburgh 12, Pa.
Waterfilm Boilers, Inc., 154 Ogden Ave., Jersey City 7, N. J.
Waterman-Waterbury Co., The, 1122 Jackson St., N. E., Minneapolis 13, Minn.
Watson & McDaniel Co., 440 N. Marshall, Philadelphia 23, Pa.
Watson-Standard Co., 225 Galveston Ave., Pittsburgh 30, Pa.
Watson-Stillman Fittings Div., H. K. Porter Co., Inc., 140 Aldene Rd., Roselle, N. J.
Watts Regulator Co., 10 Embankment St., Lawrence, Mass.
Waukesha Foundry Co., Waukesha, Wis.
Waukesha Motor Co., Waukesha, Wis.
Waverly Heating Supply Co., 31 Union St., Boston 8, Mass.
Wayne Mfg. Co., 1201 E. Lexington St., Pomona, Calif.
Wayne Pump Co., Ft. Wayne 4, Ind.
Weatherhead Co., The, 300 E. 131st St., Cleveland 8, O.
Webb Corp., The, Webb City, Mo.
Webb Machine & Tool Co., Imperial, Pa.
Webber Engrg. Corp., 411 Board of Trade Bldg., Indianapolis, Ind.
Webster & Co., Warren, 1664 Federal St., Camden, N. J.
Webster Electric Co., S. W. Corner Clark & DeKoven Aves., Racine, Wis.
Webster Engineering Co., P. O. Box 2168, Tulsa 1, Okla.
Wedgeplug Valve Co., Inc., .1300 S. Broad Ave., New Orleans, La.
Wedge Protectors, Inc., 3985 Jennings Rd., Cleveland 9, O.
Weil-McLain Co., Michigan City, Ind.
Weil Pump Co., 1523 N. Fremont St., Chicago 22, Ill.
Weinman Pump Mfg. Co., The, 290 W. Spruce St., Columbus 8, O.
Weirton Steel Co., Weirton, W. Va.
Weksler Thermometer Corp., 49 W. 32 St., New York 1, N. Y.
Weldex, Inc., 2200 W. Fort St., Detroit, Mich.
Welding Apparatus Co., 2750 W. Van Buren St., Chicago, Ill.
Welding Fittings Corp., New Castle, Pa.
Welsbach Corp., The, Kitson Div., 1500 Walnut St., Philadelphia, Pa.
Welsbach Corp., The, Ozone Processes Div., 1500 Walnut St., Philadelphia 2, Pa.
Welstrom Inc., Fifth St. & North Ford Blvd., Hamilton, O.
Western Blower Co., 1800 Airport Way, Seattle 4, Wash.
Western Brass Mills, Metals Div. of Olin Industries, Inc., East Alton, Ill.
Western Chemical Co., 713 Washington St., Kansas City 6, Mo.
Western Engineering & Mfg. Co., 4114 Ocean Park Ave., Venice, Calif.
Western Felt Works, 4029-4117 Ogden Ave., Chicago 23, Ill.
Western Lithograph Co., 600 E. 2nd St., Los Angeles 54, Calif.
Western Mineral Products Co., 1720 Madison St., N. E., Minneapolis 13, Minn.
Western Piping & Engineering Co., 119 Kansas St., San Francisco 3, Calif.
Western Precipitation Corp., 1016 W. 9th St., Los Angeles, Calif.
Western Wire & Iron Works, Inc., 957 W. 18th Pl., Chicago 8, Ill.
Western Wire Products Co., 1415-35 S. 18th St., St. Louis 4, Mo.
Westinghouse Electric Corp., P. O. Box 868, Pittsburgh 30, Pa.
Westinghouse Electric Corp., Electric Appliance Div., East Springfield, Mass.
Westinghouse Electric Corp., Sturtevant Div., 136 Readville St., Hyde Park, Boston 36, Mass.
Weston Electrical Instrument Corp., 619 Frelinghuysen Ave., Newark, N. J.
Wheatland Steel Products Co., Bankers Securities Bldg., Philadelphia 7, Pa.
Wheelco Instruments Div., Barber-Colman Co., Rockford, Ill.
Wheeler Mfg. Co., C. H., 1739 Sedgley Ave., Philadelphia 32, Pa.
Wheeling Machine Products Co., Wheeling, W. Va.
Wheeling Steel Corp., Wheeling Steel Corp. Bldg., Wheeling, W. Va.
White Flomatic Corp., P. O. Box 267, Hoosick Falls, N. Y.
White-Rodgers Electric Co., 1209 Cass Ave., St. Louis 6, Mo.
White & Sons, Inc., Wilfrid O., 178 Atlantic Ave., Boston 10, Mass.
White Mfg. Co., 2362 University Ave., St. Paul 4, Minn.
Whiteley Bearing Corp., 1238 S. Ashland Ave., Chicago 8, Ill.
Whiting Corp., Harvey, Ill.
Whiting Fire Power Products Corp., 1101 John Ave., Superior, Wis.
Whitlock Mfg. Co., 44 South St., Hartford 10, Conn.
Whitney Chain Co., 237 Hamilton St., Hartford 2, Conn.
Whitney Mfg. Co., W. A., 636 Race St., Rockford, Ill.
Whitney Metal Tool Co., 110 Forbes St., Rockford, Ill.
Whiton Machine Co., 190 Howard, New London, Conn.
Whittaker Co., Wm. R., 915 N. Citrus, Los Angeles, Calif.
Whittington Pump & Engineering Corp., 1126 Prospect, Indianapolis 3, Ind.
Whitty Co., Inc., 86 Western Ave., Boston 34, Mass.
Wickes Boiler Co., 502 N. Water St., Saginaw, Mich.
Wickwire Spencer Steel, Div. of Colorado Fuel & Iron Corp., 575 Madison Ave., New York 22, N. Y.
Wiedemann Machine Co., 4272 Wissahickon Ave., Philadelphia 32, Pa.
Wiegand Co., Edwin L., 7610 Thomas Blvd., Pittsburgh 8, Pa.
Wiggins Oil Tool Co., Inc., E. B., 3424 E. Olympic Blvd., Los Angeles 23, Calif.
Wilbur & Williams Co., 130 Lincoln St., Brighton 35, Mass.
Wilcolator Co., 1001 Newark Ave., Elizabeth B, N. J.
Wilhelm Co., A., 3rd and Bern Sts., Reading, Pa.
Wilkinson Products Co., 3987 Chevy Chase Drive, Pasadena 3, Calif.
Will Corp., 35 Russell St., Rochester 3, N. Y.
Will-Burt Co., The, Orrville, O.
Williams & Co., J. H., Buffalo 7, N. Y.
Williams Gauge Co., The, 1620 Pennsylvania Ave., N. S., Pittsburgh 12, Pa.
Williams Oil-O-Matic Div., Eureka Williams Corp., 1201 East Bell, Bloomington, Ill.
Williams & Son, I. B., Dover, N. H.
Williams Valve Co., D. T., Div. of The Schaible Co., 1086 Summer St., Cincinnati 4, O.
Williamson Heater Co., 3500 Madison Rd., Cincinnati 9, O.
Willis Steel Corp., 156 N. Academy St., Galesburg, Ill.
Willson Products, Inc., 348 Thorn St., Reading, Pa.
Will-Weld Mfg. Co., Inc., 1523 Marcy St., Omaha 2, Nebr.
Wilson & Co., Inc., 4100 S. Ashland Ave., Chicago 9, Ill.
Wilson Co., H. A., The, 105 Chestnut St., Newark, N. J.
Wilson Co., K. R., 215 Main St., Buffalo, N. Y.
Wilson Engineering Corp., 122 S. Michigan Ave., Chicago 3, Ill.
Wilson, Inc., Thomas C., 21-11 44th Ave., Long Island City, N. Y.
Windmaster Corp., 899 Ingleside Ave., Columbus 8, O.
Wind-Way Fan & Ventilator Co., 527 St. Joseph St., New Orleans 2, La.
Wing Mfg. Co., L. J., 140 Vreeland Mills Rd., Linden, N. J.
Winkler & Sons, Inc., A. E., 2337 N. 31st St., Milwaukee 10, Wis.
Winslow Engineering Co., 4069 Hollis, Oakland 8, Calif.
Wiss & Sons Co., J., 33 Littleton Ave., Newark 7, N. J.
Witte Engine Works, Oil Well Supply Div., United States Steel Co., 1600 Oakland Ave., Kansas City 3, Mo.
Wittenmeier Machinery Co., 850-860 N. Spaulding Ave., Chicago 51, Ill.
Wodack Electric Tool Corp., 4627 W. Huron St., Chicago 44, Ill.
Wolfe-Kote Co., Inc., 1225 North 8th St., Sheboygan, Wis.
Wolverine Tube Div., Calumet and Hecla, Inc., 1850 Guardian Bldg., Detroit 26, Mich.
Wood Conversion Co., 1981 First National Bank Bldg., St. Paul 1, Minn.
Wood Co., John, Conshohocken, Pa.
Wood Steel Co., Alan, Conshohocken, Pa.

Wood's Sons Co., T. B., 1275 Fifth Ave., Chambersburg, Pa.
Worner Electronic Devices, Rankin, Ill.
Worthington-Gamon Meter Co., Newark, N. J.
Worthington Corp., Dunellen, N. J.
Worthington Corp., Harrison & Worthington Sts., Harrison, N. J.
Worthington Corp., Air Conditioning & Refrigeration Div., Harrison, N. J.
Wright-Austin Co., 3245 Wight St., Detroit 7, Mich.
Wysong & Miles, 625 Fulton St., Greensboro, N. C.

X

X L Refrigerating Co., 1834 W. 59th St., Chicago 36, Ill.
X Laboratories, Inc., 25 W. 45th St., New York 19, N. Y.
X-Pando Corp., 43-15 36th St., Long Island City 1, N. Y.

Y

Yale & Towne Mfg. Co., Stamford, Conn.
Yardley Plastics Co., 138 Parsons Ave., Columbus 15, O.
Yarnall-Waring Co., 107 Mermaid Ave., Philadelphia 18, Pa.
Yates-American Machine Co., Beloit, Wis.
Yeomans Bros. Co., 2000-5 N. Ruby St., Melrose Park, Ill.
York Corp., Roosevelt Ave., York, Pa.
York Corrugating Co., Adams St. & W. M. R. R., York, Pa.
York-Shipley, Inc., York, Pa.
Yost Mfg. Co., Meadville, Pa.
Young & Bertke Co., 1004-1014 Hulbert Ave., Cincinnati 14, O.
Young Radiator Co., 709 S. Marquette St., Racine, Wis.
Young Regulator Co., 5209 Euclid Ave., Cleveland 3, O.
Youngstown Sheet & Tube Co., Stambaugh Bldg., Youngstown 1, O.
Yula Water Heaters, Inc., 166 W. 225th St., New York, N. Y.

Z

Zallea Brothers, Taylor and Locust St., Wilmington 99, Del.
Zeh & Hahnemann Co., 182-200 Vanderpool St., Newark 5, N. J.
Zenith Electric Co., 152 W. Walton St., Chicago 10, Ill.
Zimmerman Packing Co., 2768 Highland Ave., Cincinnati 12, O.
Zink Co., John, P. O. Box 310, Tulsa 1, Okla.
Zone-Heat Regulator Co., Box 188, Garrettsville, O.
Zonolite Co., 135 S. LaSalle St., Chicago 3, Ill.
Zurn Mfg. Co., J. A. Industrial Div., 1801 Pittsburgh Ave., Erie, Pa.

DIRECTORY SECTION
HEATING, PIPING, AND AIR CONDITIONING EQUIPMENT FOR INDUSTRY AND LARGE BUILDINGS

PART 4—INDEX TO ADVERTISERS AND PRODUCTS ADVERTISED IN THIS ISSUE

AEROFIN CORP. 286
Heating and cooling surface; heat exchange.

ACME INDUSTRIES, INC. 254
Evaporative condensers; air conditioning and refrigeration.

AIR & REFRIGERATION CORP. 350-351
Unit conditioners; air washers; sprayed coil units; control dampers; insulated panels; special purpose driers; articulated units; spray air washers; relief dampers; rain louvres; fire dampers.

AIR CONDITIONING EXPOSITION 300

AIR DEVICES, INC. 9
Air diffusers; filters; exhausters.

AIREACTOR CORP. 389
Space deodorizer; gyrostatic evaporator for air conditioning systems and units.

AIRTEMP DIV. OF CHRYSLER CORP. 241
Packaged air conditioners; compressors.

AIRTHERM MFG. CO. 235
Gas fired unit heaters; horizontal and vertical discharge steam unit heaters; centrifugal fan unit heaters; direct fired space heaters; convectors.

A-J MFG. CO. 345
Thin core grilles; grilles for perimeter heating; diffusers; registers; architectural grilles.

ALADDIN HEATING CORP. 334
Fans; industrial exhausters.

ALCO VALVE CO. 59
Refrigerant controls; thermo expansion valves; solenoid valves; float valves and switches; ammonia controls; suction line controls; solenoid liquid valves; constant pressure expansion valves; liquid and suction line strainers; electronic remote control of liquid level.

ALDRICH CO. 373
Boiler-burners; hot water heaters.

ALLEN-BRADLEY CO. 230
Motor controls; automatic starters; thermal relays; special refrigeration control units; pressure and temperature controls; combination starters.

ALLIS-CHALMERS MFG. CO. 92
Package pumps.

AMERICAN AIR FILTER CO., INC. 72-73
Air filters; electronic precipitators.

AMERICAN BLOWER CORP. 57
Fans for mechanical draft and industrial applications, in heating, drying, ventilating, air conditioning, fume removal and processing systems.

AMERICAN BRASS CO., THE 108
Seamless copper tubes.

AMERICAN DISTRICT STEAM COMPANY, INC. 386
Steam traps.

AMERICAN INSULATED PIPE CO. 389
Steel armoured insulated pipe.

AMERICAN RADIATOR & STANDARD SANITARY CORP. 22
Individual room, remote type, year 'round air conditioning unit.

AMES IRON WORKS 381
Automatically controlled packaged boiler unit.

ANDERSON CO., V. D., THE 343
Steam traps.

ANEMOSTAT CORP. OF AMERICA 246
Air diffusers.

ARMSTRONG MACHINE WORKS 35
Steam traps.

ASHCRAFT FUELGUARD 360
Power-type gas burner.

ATLAS MFG. CO. 232
Boiler jackets; cabinets for heating, cooling and air conditioning units.

AUER REGISTER CO., THE 312
Registers; grilles; perforated grilles.

AURORA PUMP CO. 375
Close-coupled packaged air conditioning pumps; pumps in v-belt drive, and flexible coupling drive; split case centrifugal pumps.

AUTORAD INC. 362
Finned radiation.

BABCOCK & WILCOX CO., BOILER DIV. 114
Integral-furnace boiler with dual control.

BADGER MFG. CO. 373
Expansion joints.

BAHNSON CO. 89
Industrial humidification equipment; centrifugal humidifiers; atomizer.

BAKER REFRIGERATION CORP. 293
Self-contained air conditioning unit; air conditioning unit with built-in evaporative condenser; ammonia and "Freon" compressors; air handling equipment; valves and fittings.

BALDOR ELECTRIC CO. 74
Motors; bench and pedestal grinders.

BALTIMORE AIRCOIL CO., INC. 367
Evaporative condensers; cooling towers.

BARNES & JONES, INC. 363
Control for vapor heating systems; cage units.

BASELINE MFG. CORP. 383
Baseboard radiation, convector radiation; enclosures; circulating pumps; air elimination expansion tanks.

BAYLEY BLOWER CO. 267
Air handling equipment; ventilating fans; vent sets; industrial exhausters; pressure blowers; air washers.

BEAR MFG. CO. 389
Static and dynamic balancing machines.

BECK MFG. CO. INC. 380
Special-size air filters.

BELL & GOSSETT CO. 8, 296
Forced hot water heating systems; service water heating systems; refrigeration and air conditioning equipment; centrifugal pumps; heat exchangers; boosters; universal pumps; one pipe fittings; ASME relief valves; flow control valves; high pressure relief valves; compression tanks; storage water heaters; tankless water heaters; comfort control systems; evaporators; condensers; direct expansion evaporators; liquid receivers; water coolers.

BEST COMBUSTION EQUIPMENT CO., INC., W. N. 388
Packaged system for automatic firing of fuel oil or combination oil and gas for boilers.

BINKS MFG. CO. 371
Natural draft and mechanical draft cooling towers; industrial spray nozzles.

BISHOP & BABCOCK MFG. CO., THE 387
Universal type blower.

BITUMINOUS COAL INSTITUTE 109
Coal for heat, power and process steam.

BLAW-KNOX CO. 375
Power piping; pipe hangers; vibration eliminators and supports; overhead roller assemblies; rolling action hanger assemblies; functional hangers.

BONNEY FORGE & TOOL WORKS 56
Welding fittings; reinforcement for branch connections.

BROWN PRODUCTS CO. 358
Fin tube radiation.

BRUNER CORP. 248
Water softeners; feeder for corrosion control and prevention of red water.

BRUNNER MFG. CO. 118
Packaged air conditioners; compressors.

BUFFALO FORGE CO. 14-15
Pressure blowing; air tempering; induced draft; exhausting; centrifugal fan; air cleaning; cooling; heating; forced draft, ventilating; vaneaxial fan.

BUFFALO PUMPS, INC. 258
Centrifugal pumps; double suction pumps; close-coupled pumps; multi-stage pumps.

BULLARD CO., THE 62
Horizontal boring, milling and drilling machine.

BUNDY TUBING CO. 41
Tubing for ceiling radiant heating.

BUSH MFG. CO. 4
Air handling units; comfort conditioners; unit coolers; product coolers; evaporative condensers; cooling towers; water and steam coils; convectors; finned pipe radiation; baseboard convectors; condensers; special coils; other heat transfer products.

CAMBELL HEATING CO. 107
Direct-fired space heaters; furnaces.

CANTON STOKER CORP. 269
Coal firing, handling and control equipment; binfeed stokers; coal conveyors; air jets for smoke abatement and firing efficiency.

CARNES CO., W. R. 64-65
Ceiling diffusers; integral volume controls; dampers; turning vanes; equalizing deflectors; anti-smudge rings.

CARVER PUMP CO. 36
Pumps close-coupled to continuous-duty jet pump motors; centrifugal pumps (end suction, split case, self-priming.)

CASH CO., A. W. 82
Controllers; pressure reducing valve; back pressure valve.

CENTURY ELECTRIC CO. 110
Motors for single or polyphase alternating current and direct current.

CHASE BRASS & COPPER CO. 83
Copper tube for radiant heating.

CHICAGO BLOWER CORP. 277
Centrifugal fans.

CHICAGO PUMP CO. 298, 299
Heating pumps; condensation pump and receiver; vertical condensation pump and receiver; condensation unit; return line vacuum and boiler feed pump; fire, house and circulating pumps; pneumatic and tankless water systems; sewage ejectors; bilge pumps; pumps for industrial use.

CLARAGE FAN CO. 23, 24, 25, 26, 27
Air conditioning units; vortex control, spray air washers; capillary air washers; unit ventilating sets; v-belt and direct drive; ventilating fans; exhaust fans; unit heaters; mechanical draft; fans for industrial air handling; coil units consisting of finned copper coils; galvanized settling tanks and casing.

CLEAVER-BROOKS CO. 292
Steam boilers.

CLEVELAND FUEL EQUIPMENT CO. 326
Damper control for automatic sequence control of oil, gas and stoker-fired boilers; mechanical automatic drive arm for operating dampers; steam controls; electronic smoke detector-control units; draft, air pressure and flue temperature gages.

CONNOR ENGINEERING CORP. 261
Air recovery equipment.

CONTINENTAL AIR FILTERS INC. 263
Self-cleaning automatic air filters; washable unit air filters.

COPELAND REFRIGERATION CORP. 112
Air cooled and water cooled open type and self-contained refrigeration units.

CORNISH WIRE CO., INC. 388
Wired assemblies.

CRANE CO. 259
Packless diaphragm valves; valves; fittings; pipe.

CURTIS REFRIGERATING MACHINE DIV., CURTIS MFG. CO. 11
Water cooled condensing unit; air cooled condensing unit; combination air and water cooled condensing unit; compressor units.

CYCLOTHERM DIV., U. S. RADIATOR CORP. 330
Steam generators.

DAVIS ENGINEERING CORP. 354
Indirect gas fired fuel oil heater.

De BOTHEZAT FAN, DIV. OF AMERICAN MACHINE & METALS, INC. 325
Cold rolled steel, stainless steel, rubber coated steel, monel metal, and other corrosion-resistant fans.

DELAVAN MFG. CO. 378
Spray nozzles.

DETROIT CONTROLS CORP. 236
Automatic controls for refrigeration, air conditioning, domestic heating, aviation, transportation, home appliances, industrial uses; timed cycling thermostat and gas valve.

DETROIT STOKER CO. 100
Stokers.

DIAMOND MFG. CO. 391
Grilles.

DODGE MFG. CORP. 249
Power transmission machinery; fan bearing for mechanized draft installations; v-belts; taper-lock sheaves; speed reducers; pillow blocks; clutches.

DOLE VALVE CO. 106
Automatic hot water air valve; flow control valve; vent valve; water mixer; automatic registers.

DOLLINGER CORP. 95, 96, 97, 98
Precipitator (electronic filter); intake filter; dry panel filter; automatic self cleaning type filter; pipeline filter; hydraulic filter; viscous panel filter; gas filter; liquid filter.

DRAVO CORP. 301
Direct fired air heaters.

DRAYER-HANSON INC. 271
Air conditioning equipment; room unit air conditioners; central air conditioning unit.

DUNHAM CO., C. A. 111
Fin tube radiation.

DURANT INSULATED PIPE CO. 247
Pre-sealed insulated piping.

DURANT INTERNATIONAL CORP. 247
Pre-sealed insulated piping.

DURKEE-ATWOOD CO. 7
V-belts.

DUTTON BOILER DIV., HAPMAN-DUTTON CO. 295
Self-contained, automatic packaged boilers.

EAGAN CO., INC., WALTER H. 364
Condensate pump.

ECONOMY PUMPS, INC., DIV. OF C. H. WHEELER MFG. CO. 16-17
Hot water circulating pumps—vertical direct connected, close coupled vertical or horizontal mounted; vertical vacuum pumps; horizontal vacuum pumps; return condensation pumps; vertical underground pump; condensation pump with steel receiver; lightweight pump; horizontal return condensation pumps.

ELLIOTT CO., CROCKER-WHEELER DIV. 347
Protected-type motors.

EVERLASTING VALVE CO. 361
General service, fire protection, steam jacketed, and boiler blow-off valves.

FARR CO. 6
Self-washing filters; engine filters; rotary coolers; panel filters.

FARRIS STACON CORP. 361
Temperature regulator for steam, liquids, gases.

FEDDERS-QUIGAN CORP. 262
Convector-radiators; baseboard radiation; wall radiation; unit heaters.

FIELD CONTROL DIV., H. D. CONKEY & CO. 355
Draft controls for gas fired heating plants.

FITZGIBBONS BOILER CO. INC. 221
Steel boilers.

FLEXITALLIC GASKET CO. 335
Spiral-wound gaskets for pipe flanges, pressure vessels and process equipment.

FLEXONICS CORP. 273
Expansion joints for piping systems; convoluted and corrugated flexible metal hose; stainless steel and brass bellows; flexible metal conduit and armor; assemblies of these components.

FOSTER CO., BENJAMIN 99
Industrial insulation surfacing; lagging cloth.

FRICK CO. 356
Refrigerating and air conditioning compressors.

FRIGIDAIRE DIV., GENERAL MOTORS CORP. 228
Residential air conditioners; self contained air conditioners; window type room air conditioners; compressors; cooling coils.

FULTON SYLPHON DIV., ROBERTSHAW-FULTON CONTROLS CO. 250
Temperature regulators for heating, ventilating or air conditioning.

FURNAS ELECTRIC CO. 379
Electric motor controls; magnetic starters and contactors; selector switch.

G & O MFG. CO., THE 388
Coils for heating and cooling; radiation.

GALLAHER CO., THE 317
Direct connected power roof exhauster; axial flow power exhausters.

GARDNER-DENVER CO. 274
Compressors; pumps.

GENERAL BLOWER CO. 306
Fans and blowers.

GENERAL CONTROLS 68-69
Self-generating heat control system; thermostats; gas valve; pilot generators.

GENERAL ELECTRIC CO. 60-61
Motors.

GLASS FIBERS INC. 276
Glass fiber insulating wool for steam-tracer lines, valves and fittings, nested pipes, domestic boiler, warm air furnace, and air conditioner; yarns; rovings; micro-fibers; pipe wraps; industrial mat; vapor barriers; machinery mounting and packaging materials; aircraft insulations.

GLASFLOSS 105
Disposable air filters.

GLOBE STEEL TUBES CO. 304
Steel, stainless steel, seamless, high purity iron, corrosion resistant steel, alloy steel, carbon steel, high temperature service steels, standard and special analysis steel tubes; mechanical and pressure tubing.

GORDON & PIATT 365
Gas burner for vertical firing; horizontal gas burner.

GORTON HEATING CORP. 387
Air eliminator and equalizing valves for steam mains, unit heaters, and radiators.

GOVERNAIR CORP. 338-339
Packaged air conditioners; evaporative condensers; cooling towers; unit coolers; blast coils for heating and cooling.

GOULDS PUMPS INC. 376
Centrifugal pumps.

GRABLER MFG. CO., THE 340
Pipe hangers; malleable fittings; AAR fittings; unions; rail fittings; cast iron steam and drainage fittings; drainage fittings; copper tube solder-joint fittings; steel pipe nipples.

GREENLEE TOOL CO. 346
Pipe bit set; hydraulic pipe benders; tubing benders; hydraulic pipe pushers; pipe bits, auger bits; spiral screwdrivers; chisels.

GRINNELL CO., INC. .... Inside front cover
Horizontal delivery, textile (horizontal delivery), vertical delivery, and velocity nozzle (horizontal delivery) unit heaters.

GUSTIN-BACON MFG. CO. 234
Thermal duct insulation; acoustical duct liner; outward clinching staple gun.

HALSTEAD & MITCHELL 86
Cooling towers.

HANDY & HARMAN 270
Low-temperature silver brazing alloys.

HASTINGS INSTRUMENT CO., INC. 363
Air meter; manometer and flow meters; vacuum gages.

HAYES MFG. & SUPPLY CO. 307
Suspended duct furnace; forced air furnace; suspended unit heater; forced air suspended furnace; gas furnaces.

HAYS CORP., THE 374
Orsat gas analyzer.

HEATING AND VENTILATING EXPOSITION 300

HENDRICK MFG. CO. 363
Perforated metal grilles; perforated metals; perforated metal screens; wedge-slot screens; architectural grilles; steel flooring; treads.

HENRY VALVE CO. 239
Packless valve; ammonia valve; wing cap valve; strainer; y-strainer; balanced-action packless liquid level gages; check valve; drier; extra capacity drier; diaphragm relief valve; straight-though relief valve.

HOFFMAN SPECIALTY MFG. CORP. 88
Vacuum pumps.

HUSSEY & CO., C. G. 229
Copper and brass.

ILG ELECTRIC VENTILATING CO. 289
Direct-drive tubeaxial duct fans

ILLINOIS ENGINEERING CO. .... Inside back cover
Zone control; high vacuum heating system; pneumatic control system governed by electronic outdoor-indoor controllers; vacuum and vapor systems; radiator valve; radiator trap; float and thermostatic trap.

ILLINOIS TESTING LABORATORIES, INC. 342
Instantaneous, direct reading air velocity meter; pyrometers; dew pointers; thermo-anemometers; controllers.

INDEPENDENT REGISTER CO., THE 43
Wall, baseboard and floor registers and grilles.

INDUSTRIAL ACOUSTICS CO., THE 390
Noise silencers for power plants, air conditioning systems, cooling towers, boiler rooms, power generators, transformers, fans, intake and exhaust systems, machinery, jet engines.

INDUSTRIAL SOUND CONTROL INC. 264-265
Noise suppression; sound absorptive panels; sound traps; sound blanket.

INFRA INSULATION, INC. 117
Reflective insulation.

INGERSOLL-RAND CO. 103
Motor-pump units.

JACKSON CO., BYRON 226-227
Chemical pumps; process pumps; vertical circulating pumps; close-coupled motor and pump unit; mechanical seals; sump pump; deep well turbine pumps; submersible pumps; rain pump; horizontally split case pumps.

JAN-AIR, INC. 390
Blower wheels.

JEFFERSON UNION CO. 362
Specialty unions.

JENKINS BROS. 322
Valves.

JENN-AIR PRODUCTS CO. 310
Power exhausters for walls and roofs.

JOHNS-MANVILLE 288
Duct insulation.

JOHNSON SERVICE CO. .... Outside back cover
heating-cooling thermostats; valves; master-submaster control.
heating-cooling thermostats; valves; master-submaster control.

JOY MFG. CO. 104
Axial flow fans.

KEASBEY & MATTISON CO. 268
Insulations; 85% magnesia.

KECKLEY CO., O. C. 384
Diaphragm regulators; (self-contained, instrument or pilot control); pressure regulators; float boxes; temperature regulators; pop safety valves; relief valves; float valves; balanced valves; pump governors; strainers.

KENNARD CORP. 302
Cooling towers; heating and ventilating units; multi-zone units; sprayed coil dehumidifiers; evaporative condensers; air conditioning blower units; direct expansion coils, water coils, steam distributing tube coils, standard steam coils.

KENNEDY VALVE MFG. CO., THE 278
Iron-body valves; bronze valves; low pressure bronze valves; cast iron pipe fittings; malleable iron and bronze pipe fittings; backwater valve.

KEWANEE-ROSS CORP. 392
Combination oil-gas burner and scotch type boiler.

KEY CO. 368
Pipe joint compound.

KLIPFEL VALVES INC. 376
Reducing valves; thermostatic valves; float valves; multiport back pressure valves.

KORFUND CO. INC., THE 352-353
Steel spring vibration isolators.

KRITZER RADIANT COILS, INC. 331
Standard baseboard; universal baseboard; convector, slotted front; convector, louvered front; fin pipe coil; flat top cover, slope top cover; utility cover, expanded metal cover.

LADISH CO. 285
Pipe fittings.

LAHARCO INDUSTRIES 385
Gas conversion burners for commercial and industrial installations; commercial units for restaurant ranges and boilers; utility conversion units for small commercial installations; domestic conversion units.

LEE CORP. 281
Stoker fired, light oil fired, gas fired, and heavy oil fired space heaters.

LEE-DON, INC. 385
High thermal-conductivity aggregate to add to concrete and other plastic mixes to increase density and heat conductivity of the mass.

LEE VINE FIN TUBE RADIATOR CO., INC. 391
Fin tube radiator.

LESLIE CO. 311
Regulators and controllers for pressure, temperature, flow and liquid level; diaphragm control valve; control pilot; pump governor; self-cleaning strainer; reducing valve; floatless level control for boilers, tanks, evaporators, heaters, standpipes, etc.

LEWIN-MATHES CO. 91
Copper and brass tube, pipe and fittings.

LILIE-HOFFMANN COOLING TOWERS 279
Induced draft, horizontal draft (package), and atmospheric spray cooling towers.

LUG-ALL CO., THE 366
Winch hoist.

MAID-O'-MIST, INC. 101
Automatic air valves; air eliminators; automatic humidifiers; water line controls; heating specialties; balancing valve adapter units.

MANNING & LEWIS ENGINEERING CO. 348
Water heating.

MARLEY CO., THE 47
Cooling towers.

MARLO COIL CO. 90
Multi-zone air conditioning units; cooling towers; evaporative condensers; industrial coolers; air conditioning units; blast heating and cooling coils.

McCORD CORP. 368
Horizontal type unit heaters; vertical type unit heaters.

McDONNELL & MILLER, INC. 19
Feeder-cutoff combination for boilers; low water cutoff for automatically fired boilers; water level control for boilers.

McQUAY INC. 48-49
Water coil; cleanable tube water coil; direct expansion coil; blast heating steam coil; room air conditioning unit; air conditioner (suspended model); air conditioner (floor model); horizontal unit heater; downflow unit heater; blower type unit heater (suspended model); blower type unit heater (floor model).

MERCOID CORP., THE 102
Automatic controls for temperature, pressure, liquid level; relays; mercury switches; oil burner controls.

METTLER CO. INC., THE 314
Combination gas-oil burners.

MIDWEST PIPING & SUPPLY COMPANY, INC. 12-13
Pipe welding fittings; flanges.

MILLER ELECTRIC MFG. CO. 386
Spot welders.

MINNEAPOLIS-HONEYWELL REGULATOR CO. 44-45
Temperature control.

MIRACLE ADHESIVES CORP. 321
Surface anchors, spindle anchors, and pronged anchors for fastening insulation.

MODINE MFG. CO. 93
Horizontal delivery type, vertical delivery type, and gas-fired type unit heaters; convector radiation; cabinet units; heating coils.

MONARCH MFG. WORKS, INC. 282
Spray nozzles for air washers, cooling towers, humidifiers, air conditioners, and nozzles for oil burners.

MUCKLE MFG. CO. 369
Propeller driven, roof mounted ventilators; fresh air intakes.

MUELLER FURNACE CO., L. J. 333
Unit for home cooling; winter air conditioner; self-contained air conditioner; highboys; counterflows; attic furnaces; gas boilers.

MULTI-VENT DIV., THE PYLE-NATIONAL CO. 303
Low velocity air diffusing panels for metal pan ceilings.

MUNDET CORK CORP. 272
85% magnesia pipe covering and block insulation.

MURRAY MFG. CO., D. J. 284
Unit heaters and blast coils.

NASH ENGINEERING CO., THE 122
Return line vacuum heating pump.

NATIONAL TUBE DIV., UNITED STATES STEEL CORP. .. 260
Steel pipe.

NATIONAL HEATER CO., THE 367
Direct-fired heaters for heavy and light oil.

HERMAN NELSON PRODUCTS, AMERICAN AIR FILTER CO., INC. 72-73
Unit heaters; unit blowers; propeller and centrifugal fans; unit ventilators.

NESBITT, INC., JOHN J. 50-51
Unit ventilator; radiation; baseboard radiation; convector; gas-fired unit heater; horizontal and vertical blow unit heaters; blower type unit heaters; cabinet unit heaters; heating surface; water surface for air cooling, dehumidifying and heating.

NEW YORK BLOWER CO., THE 29
Fans; blowers; unit heaters; makeup air units; heavy duty heat surface.

NIAGARA BLOWER CO. 365
Controlled humidity air conditioning; absorption dehumidifier.

NICHOLSON & CO., W. H. 28
Industrial steam traps.

OHIO BRASS CO. 87
Bronze, globe, angle, gate, and check valves.

OHIO INJECTOR CO., THE 223
Bronze, iron, cast steel, and forged steel valves.

OLSON & CO., ARTHUR A. 290
Gas, oil, coal or dual gas and oil direct fired air heaters.

ORR & SEMBOWER, INC. 58
Packaged automatic boilers.

PACKLESS METAL HOSE INC. 385
Seamless bronze vibration absorbers.

PALEY MFG. CORP. 377
Convection electric heating.

PARAGON ELECTRIC CO. 389
Seven-day calendar time switch.

PATTERSON-KELLEY CO., INC. 84
Hot water storage heaters.

PEERLESS ELECTRIC CO., THE 318
Blower-filter package unit; furnace blowers; belt drive exhaust fans; direct drive utility blowers; belt drive utility blowers; industrial exhaust fans; pressure blowers; penthouses.

PEERLESS PUMP DIV., FOOD MACHINERY & CHEMICAL CORP. 283
Booster pressure systems; water supply and transfer; turbine vane type pumps; general purpose split-case pump; end-suction, face mount and flexible coupled pumps; multi-stage pump; all purpose water pump; vertical turbine type pumps.

PENN CONTROLS, INC. 94
Unit heater controls; heating controls; refrigeration and air conditioning controls; cooling thermostats; humidistats; water valves; solenoid valves; magnetic starters; temperature and pressure controls; oil protection controls for pressure-lubricated refrigeration compressors.

PENN VENTILATOR CO. 366
Propeller fan—centrifugal fan, stationary, rotary and ridge roof ventilators and accessory products.

PERFEX CORP. 370
Controls for gas, oil, or stoker firing.

PHILLIPS COOLING TOWER CO., INC. 377
Cooling towers.

PORTER & CO., INC., H. W. 327
Conduit for underground steam lines.

POWELL CO., WM., THE, ... 46
Bronze, iron, steel and corrosion-resisting valves.

POWERS REGULATOR CO. 37, 38, 39, 40
Air Conditioning Control Systems; Water Heater control; summer and winter air conditioning control valves.

PRITCHARD & CO., J. F. 32-33
Packaged and custom cooling towers.

RAY OIL BURNER CO. 392
Combination oil-gas burner and scotch type boiler.

REGISTER & GRILLE MFG. CO., INC. 378
Registers and grilles.

REMPE CO. 383
Storage tank oil preheaters; pipe coils; heat transfer equipment.

REVERE COPPER & BRASS INC. 121
Copper water tube for radiant panel heating, hot and cold water lines, underground service lines, processing lines and waste stack and vent lines.

RIC-WIL CO., THE, ... 374
Insulated pipe lines.

RIDGE TOOL CO., THE, ... 328
Pipe wrenches; pipe tools.

RITTER PATTERN & CASTING CO., INC. 390
Floor and ceiling plates.

RITTLING CORP., THE 297
Finned tubing; sill type radiation; baseboard or wall hung radiation; cabinet convectors; horizontal or vertical unit heaters.

ROBVON BACKING RING CO. 291
Backing rings for welding pipe, valve and fitting joints.

ROCKWELL CO., W. S. 372
Butterfly and slide valves.

RUPPRIGHT, SIEGFRIED 389
Rotary roof cooler.

SALL BROTHERS CO. 387
Filler and relief valve for controlling pressures in hot water heating systems; fittings for hot water system.

SARCO CO., INC. 81
Heating specialties; radiator traps; radiator valves; float-thermostatic steam traps.

SARCOTHERM CONTROLS, INC. 80
Control for steam heating systems; hydraulic-electric control valve; orifice plates; remote program control panel; modulating control valve.

SEALMASTER, DIV. OF STEPHENS-ADAMSON MFG. CO. 30
Ball bearing units.

SELLERS ENGINEERING CO. 244
Immersion steam boiler; blast heaters; immersion automatic water-heaters; combustion units; industrial gas burners; immersion tank heaters; vertical steam boilers; gas combustion equipment.

SERVEL, INC. 313
Water chiller for air conditioning, process cooling, and industrial precooling.

SKIDMORE CORP. 251, 252
Vertical condensation type pumps; condensate pump with sump type receiver; turbine pump; single unit and duplex unit vacuum pumps.

SMITH CO. INC., H. B., THE 54, 55
Cast iron boilers for heating and domestic hot water; boiler-burner units; oil or hand-fired hot water supply units; gas-fired boiler.

SOUTH BEND AIR PRODUCTS, INC. 382
Propeller fans; man coolers; extension arm fans for hot or explosive gases; duct fans.

SPANG-CHALFANT, DIV. OF THE NATIONAL SUPPLY CO. 18
Steel pipe.

SPENCE ENGINEERING CO., INC. 238
Automatic regulating valves: pressure, temperature, differential pressure, back pressure, pump governors.

SPENCER HEATER, LYCOMING-SPENCER DIV., AVCO MFG. CO. 31
Divided low-waterline boiler; steel heating boiler.

SPRAYING SYSTEMS CO. 384
Spray nozzles.

STANDARD STAMPING AND PERFORATING CO. 349
Perimeter floor register with control; multiple valve register.

STERLING, INC. 380
Condensation and vacuum pumps; heating specialties; temperature controls.

STEDCO PRODUCTS CO. 237
Convectors; Baseboard radiation.

STEWART MFG. CO., INC. 381
Air conditioning outlets; registers; grilles; scoops; opposed action valves.

STIC-KLIP MFG. CO. 387
Fasteners for insulation installation; spring clip for control tubing; high strength adhesive.

SUPERIOR COMBUSTION INDUSTRIES INC. 305
Automatic steam generators for oil, gas or both.

SURFACE COMBUSTION CORP. 357
Absorption dehumidifiers; humidity conditioning systems; industrial furnaces and burners; automatic space heating equipment.

SWARTWOUT CO., THE 63
Gravity roof ventilators; power roof ventilators; fresh air intake louvers; power plant equipment; process industry controls.

SWIFT & CO., ADHESIVE PRODUCTS DEPT. 315
Lagging adhesive for pipe insulation.

TACO HEATERS, INC. 233, 379
Circulators for radiant, radiator, convector or baseboard heating; water chillers.

TAYLOR FORGE & PIPE WORKS 275
Welding fittings; flanges; spiral-weld pipe; electric-weld pipe.

TAYLOR INSTRUMENT CO. 294
Instruments for indicating, recording and controlling temperature, pressure, flow, liquid level, speed, density, load and humidity; control system; dew point transmitter; dry bulb transmitter.

THRUSH & CO., H. A. 266
Horizontal hot water heating circulators.

TITUS MFG. CORP. 75, 76, 77, 78
Air conditioning outlets; grilles and registers; directional outlets; volume controllers; return air grilles; auxiliary frames; convector grilles; perforated grilles; stamped steel wall registers.

TITUSVILLE IRON WORKS CO., THE 344
Split firebox boilers.

TRANE CO., THE 66-67
Packaged water chiller; units with individual control of heating, cooling for multi-room system; air conditioners.

TRERICE CO., H. O. 372
Industrial thermometer; self-operating regulator; dial thermometer; steam trap; temperature instruments.

TRIMOUNT INSTRUMENT CO. 384
Manometers—well type, U tube, absolute pressure; micro manometers; inclined manometers; draft gauges; indicating flow meters; liquid level gauges; electronic level control.

TRINDL PRODUCTS LTD. 383
Arc welders.

TRION, INC. 240
Equipment for electrostatic cleaning and purification of air or other gases.

TUBE TURNS, INC. 319, 320
Welded Pipe Fittings and Flanges.

TUTTLE & BAILEY INC. 242-243
Ceiling diffusers; high pressure diffuser units; supply air grilles and registers; return air grilles and registers; convectors; baseboard.

UNISTRUT PRODUCTS CO. 287
Channel and fittings for conduit, cable, pipe and tubing hangers and supports, framing, mounts, racks, tables, benches, and other structures.

UNION ASBESTOS & RUBBER CO. 336, 337
Pipe insulation.

UNITED COOLING TOWER CO. 369
Redwood filled steel cooling towers.

UNITED ELECTRIC CONTROLS CO. 364
Thermostats.

UNITED STATES AIR CONDITIONING CORP. 3
Central station type air conditioning units; unit air conditioners; remote compressor air conditioning units; window type room units; gas fired unit heaters; heating and cooling coils; blower heaters; ventilating blowers; evaporative condensers; housed ventilating set; room air conditioner; home air conditioner; store conditioners.

UNITED STATES GAUGE, DIV. OF AMERICAN MACHINE & METALS, INC. 309
Dial thermometer; industrial thermometer; special thermometers.

U. S. STEEL CORP. 34, 260

UNITED STATES STEEL SUPPLY DIV., UNITED STATES STEEL CORP. 34
Steel and steel products.

UNIVERSAL DIFFUSER CORP. 280
Ceiling diffusers.

UTILITY APPLIANCE CORP. 79
Forced air furnace; dual wall heater.

VULCAN RADIATOR CO., THE 85
Baseboard radiation.

WAGNER ELECTRIC CORP. 222
Motors for pumps and compressors; transformers.

WALDRON CORP., JOHN 21
Gear coupling for fractional hp drives.

WALWORTH CO. 231
Bronze valves in gate, globe, angle, check and lubricated plug types; valves; pipe fittings; pipe wrenches.

WATSON-STILLMAN FITTINGS DIV., H. K. PORTER CO. INC. 245
Forged stainless fittings.

WEBSTER & CO., WARREN 52-53
Steam or hot water radiation for perimeter heating.

WEBSTER ENGINEERING CO., THE 20
Dual fuel firing gas and oil burner.

WEIL PUMP CO. 70-71
Sewage ejectors; condensate pumps; sump pumps; submersible cellar drainer.

WEKSLER THERMOMETER CORP. 385
Dial thermometer; pressure gauge; portable recorder; recording thermometer; hygrometer and psychrometer.

WESTERN ENGINEERING & MFG. CO. 386
Rotary ventilator.

WESTINGHOUSE ELECTRIC CORP., STURTEVANT DIV. .. 255
Axial flow fans.

WHEATLAND TUBE CO. 256
Steel pipe.

WHITE-RODGERS ELECTRIC CO. 10
Combination gas valve and safety pilot; controls for refrigeration, heating and air conditioning.

WHITLOCK MFG. CO., THE 359
Instantaneous heaters; storage heaters; fuel oil heaters; water chillers.

WIEGAND CO., EDWIN L. 382
Electric blower-type heaters.

GRANT WILSON, INC. 42
Asbestos protected duct insulation; asbestos and insulating materials.

WING MFG. CO., L. J. 224-225
Unit heaters; fans; blowers; turbines; revolving unit heaters; duct fan; turbine blowers; door heaters; heater sections; straight line duct fans; draft inducer.

WOLVERINE TUBE DIV. of CALUMET & HECLA, INC. .. 329
Capillary tube; tubing.

WORTHINGTON CORP., AIR CONDITIONING & REFRIGERATION DIV. 257
Air conditioning and refrigeration.

YARNALL-WARING CO. 332
Steam traps and strainers.

YORK-SHIPLEY, INC. 253
Packaged steam generators; iris shutter; metering oil pump.

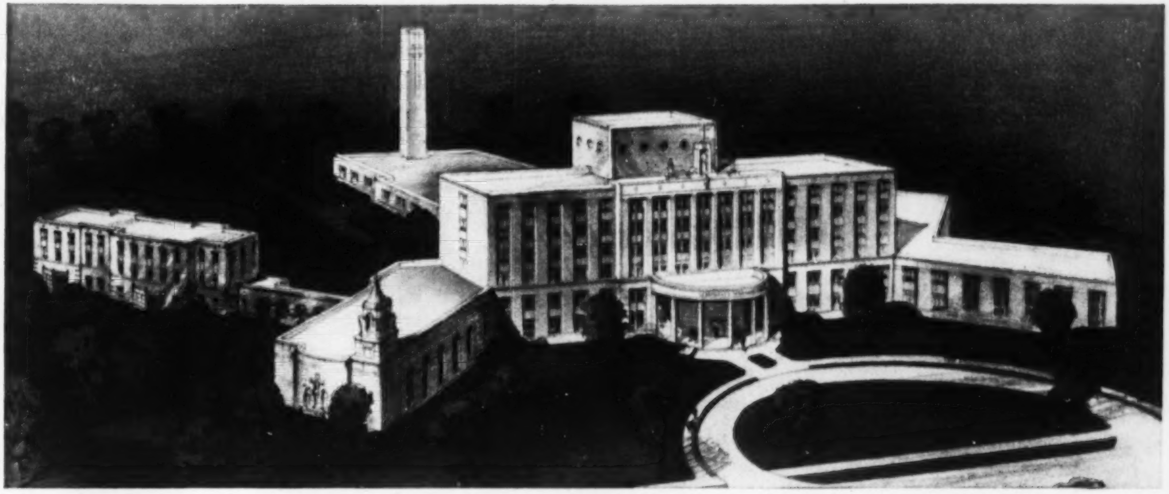
YOUNG RADIATOR CO. 341
Convectors; vertical blow and horizontal blow unit heaters; gas-fired unit heaters; cooling coils; heating coils; air conditioning units.

YOUNGSTOWN SHEET & TUBE CO., THE 113
Pipe and tubular products; sheets; plates; railroad track spikes; conduit; hot and cold finished carbon and alloy bars; wire; electrolytic tin plate; coke tin plate; rods.

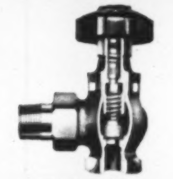
"Z" CRETE DIV., ZONOLITE CO. 316
Monolithic insulation for underground heated piping.

ZINK CO., JOHN 308
Gas burners; vertical gas burner; suspended gas-fired unit heater.

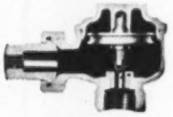
ILLINOIS
ZONE CONTROL



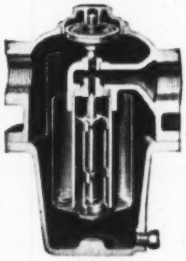
ST. ANTHONY'S MEMORIAL HOSPITAL, Effingham, Illinois
Architect: HENRY R. SLABY, A. I. A., Milwaukee, Wisconsin
Heating Contractor: PETERSON PLUMBING AND HEATING, Centralia, Ill.



Series 48
Radiator Valve



Series G
Radiator Trap



Series G
Float and
Thermostatic Trap

An ILLINOIS High Vacuum Heating System perfectly controlled assures maximum fuel economy, comfort and convenience in this new hospital, convent, chapel group.

Steam is supplied from a high pressure boiler plant, with pressure reduced to two or three pounds for the heating, ventilating and air conditioning.

The hospital is heated with a four-zone ILLINOIS Type A Pneumatic Control System governed by electronic outdoor-indoor controllers. Operating rooms and maternity wards are heated by separate systems with individual control. The convent is equipped with a two-zone Cycling Flow Control System controlled by Type E-4 electric valves with two-stage thermostat and immersion stat.

See our exhibit
Booth 1142
International
Exposition, Chicago
January 26-31

Other ILLINOIS Heating Systems include Type C Generation Control as well as the Standard Vacuum and Vapor Systems.

Write for Bulletins

ILLINOIS ENGINEERING COMPANY
INCORPORATED 1900
RACINE AVENUE AT 21ST STREET • CHICAGO 8

64,000 HOURS A DAY
of All-Weather Comfort
with JOHNSON
Automatic
CONTROL

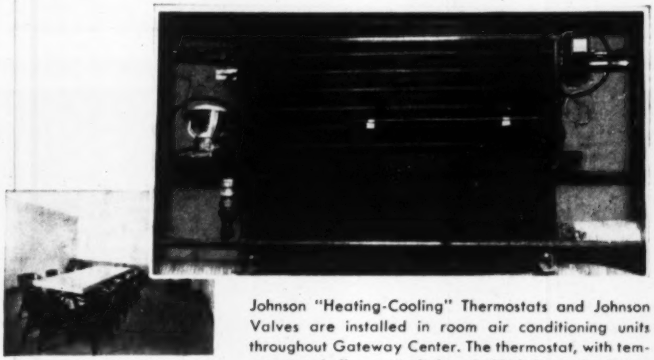
Gateway Center, crown jewel of Pittsburgh's fabulous Golden Triangle, is acclaimed everywhere as a triumph of advanced design, engineering skill and farsighted enterprise. In its creation, perfection was the only standard.

For example, with Johnson Control in command of the air conditioning system, there is automatic comfort control every minute of the day for the 8,000 people who will occupy these modern buildings. In each bay or private office on the periphery, a Johnson "Heating-Cooling" Thermostat permits individual weather selection by the occupants. Nearly 2,000 Thermostats and more than 5,900 Johnson Valves, regulating the supply of hot and cold water in modern Carrier Weathermaster room air conditioning units, assure complete year 'round personal comfort for each occupant.

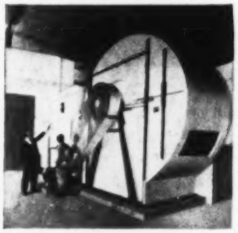
In addition to *individual room temperature control*, behind the scenes there is Johnson Master-Submaster Control to operate valves and dampers to regulate temperatures and humidities of the air supplied by the primary and central air conditioning systems serving the individual room units and the interior zones of the buildings. In the basement areas, other Johnson instruments operate valves and dampers on unit ventilators and exhaust fans.

Gateway Center, involving one of the world's largest automatic air conditioning control systems, is another convincing demonstration that *any* control problem is best solved by Johnson . . . the only nationwide organization devoted exclusively to planning, manufacturing and installing automatic temperature and air conditioning control systems. Ask a Johnson engineer from a nearby branch office for recommendations on any control problem—large or small, in both new and existing buildings. There is no obligation. JOHNSON SERVICE COMPANY, Milwaukee 2, Wisconsin. Direct Branch Offices in Principal Cities.

Equitable Life Assurance Society's Gateway Center, Pittsburgh
Architects—Eggers and Higgins, New York, and Irwin Clavan, New York
Consulting Engineers—Meyer, Strong and Jones, New York
Builder—Starrett Bros. and Eken, New York
Air Conditioning Contractors—Kerby Saunders, Inc., New York



Johnson "Heating-Cooling" Thermostats and Johnson Valves are installed in room air conditioning units throughout Gateway Center. The thermostat, with temperature bulb mounted close behind the recirculating grille, responds quickly to average room temperature. In turn, the Johnson valve regulates the hot and cold water supply to the coil of the unit and automatically applies exactly the right heating or cooling effect.



At left above, J. S. McCorkle, chief engineer of Gateway Center, points to Johnson Humidostat and Johnson Piston Damper Operators on this typical fan installation serving an interior zone of one building. A Johnson Humidostat measures and automatically controls the humidity of the spaces.

At right above is one of three 1500 ton Carrier centrifugal refrigerating machines that furnish chilled water for air conditioning. A Johnson Record-O-Stat (2-pen type) measures and records temperatures of both inlet water and water leaving the chiller. The temperature of the water leaving the chiller is automatically controlled by the Record-O-Stat, which operates the suction dampers of the huge machine.

JOHNSON *Automatic Temperature and Air Conditioning* **CONTROL**

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